# THE IMPACT OF DEVELOPMENT AID ON THE RESOURCES OF A RECIPIENT COMMUNITY IN THE BURA FUELWOOD PLANTATION PROJECT, KENYA: PARTICIPATORY RESEARCH AS AN APPROACH TO DEVELOPMENT AID

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ABBREVIATIONS

| | |
|---|---|
| ALU | Adult Labour Unit |
| AP | Administrative Police |
| APC | Annual Programme Consultations |
| BBF | Bura Building Force |
| BFD | Bura Forest Department |
| BFPP | Bura Fuelwood Plantation Project |
| BISS | Bura Irrigation and Settlement Scheme |
| DAC | Development Assistance Committee of OECD |
| DANIDA | Danish International Development Agency |
| DDC | District Development Committee |
| DDP | District Development Plan |
| DDO | District Development Officer |
| DFRD | District Focus for Rural Development |
| DvDC | Divisional Development Committee |
| FAO | Food and Agriculture Organization (UN) |
| FFW | Food for Work |
| FIM | Finnish Markka |
| FINNIDA | Finnish International Development Agency |
| FORP | Forestry Research Programme |
| GNP | Gross National Product |
| IBRD | International Bank for Reconstruction |
| ICRAF | International Council for Research in Agroforestry |
| IDS Helsinki | Institute of Development Studies, Helsinki |
| IDS Nairobi | Institute for Development Studies, Helsinki |
| ILO | International Labour Organization (UN) |
| KSH | Kenyan Shilling |
| LDC | Local Development Committee |
| MoALD | Ministry of Agriculture and Livestock Development |
| NIB | National Irrigation Board |
| NORAD | Norwegian International Development Agency |
| ODA | Official Development Assistance |
| OECD | Organization of Economic Co-operation and Development |
| PAR | Participatory Action Research |
| PP | People's Participation |
| PR | Participatory Research |
| PRA | Participatory Research Approach |
| SEK | Swedish Krona |
| SERP | Social and Economic Research Programme |
| SIDA | Swedish International Development Agency |
| SIS | Specific Interest Space |
| sw. | Swahili-language |
| TAP | Technical Assistance Personnel |
| TARDA | Tana and Athi River Development Authority |

| | |
|---|---|
| TRDA | Tana River Development Authority |
| UNECA | United Nations Economic Commission For Africa |
| UNRISD | United Nations Research Institute for Social Development |
| WCED | World Commission on Environment and Development |
| WHO | World Health Organization |
| WID | Women in Development |

## ABSTRACT

THE IMPACT OF DEVELOPMENT AID ON THE RESOURCES OF A RECIPIENT COMMUNITY IN BURA FUELWOOD PLANTATION PROJECT, KENYA: PARTICIPATORY RESEARCH AS AN APPROACH TO DEVELOPMENT AID

The purpose of this thesis is two-fold: to study the impact of a development aid programme on the resources base of a recipient community at the grassroots level, and the success of Participatory Research as an approach to the successful implementation of development aid. The case study is on the Bura Fuelwood Plantation Project (BFPP), which is located on the Bura Irrigation and Settlement Scheme (BISS) in Eastern Kenya. This study focuses on the problem of domestic fuel shortage with women as the main interest group. Participatory Research is used as an approach to assessing the impact of aid on the forestry related resources of the tenant farmers in Bura, and improved stoves are focused on as one domestic strategy to meet the fuel shortage.

The hypotheses are that BFPP has had an impact on the resources the people in Bura have for creating their own development strategies, and that the Participatory Research Approach (PRA)can increase the recipients' access to and control of resources within the framework of aid. It is argued that aid programmes create space by establishing parallel structures to existing ones. The concept of Specific Interest Space (SIS) is developed on the basis of fieldwork in Bura to facilitate the

analysis of space, in terms of control and distance, from the viewpoint of a group of people sharing a common interest. In order to test the hypotheses the forestry related needs and resources of villagers in Bura are analyzed. This analysis focuses on gender, with emphasis on women's needs and resources. It is argued that BFPP introduces new technical, personnel and financial resources. But as the Project maintained control over these resources as well as gained partial control over resources that existed prior to the project, in some cases villagers' opportunities to design and implement their own development strategies in the forestry sector were diminished.

The conclusion of the thesis is that the impact of development aid is strongest within a recipient community. Therefore development aid should be based primarily on needs and resources that exist within the community. It is also concluded that PRA can be used within aid framework to initiate and maintain dialogue between donors, implementors and recipients.

# 1. INTRODUCTION

## 1.1. Introduction

During the latter half of the 20th century, development aid has played an increasing role in the political and economic relationship between the First and Third Worlds. From the point of view of global economic development, however, the role of development aid in the realization of national and regional development aims has been exaggerated. For example in Sub-Saharan Africa gains and losses in income for 1986 were such that monetary flow into Africa was $18 billion (of which development assistance was $16 billion and private lending $2 billion) while the flow out of Africa totalled $34 billion (drop in commodity prices $19 billion, debt service $15 billion) (UNECA and UNDP in Pietilä, 1988). These figures still exclude such monetary losses to the African continent as incurred via capital escape, transfer of profits and changes in currency rates. However, development aid can have a considerable impact on local development. The presence of an aid project can often mean real changes; shifts of political power, changes in decision making and changes in the local economy as a whole.

The Bura Fuelwood Plantation Project (BFPP), which is the case study for my thesis, is a development aid project funded by the Finnish International Development Agency (FINNIDA) and is located within an irrigation and settlement scheme originally sponsored by the World Bank in Eastern Kenya. During the fieldwork I was employed as the Resident Anthropologist by the Institute of Development Studies (Helsinki) to design and implement a socio-economic research programme for BFPP. The material

for the analysis of the potential of participatory research in empowerment of communities has been collected through the Social and Economic Research Programme within this institutional framework. Social and Economic Research Programme (SERP) is discussed in depth later, but it is necessary to make clear that although BFPP did have specific expectations regarding the kind of information generated through SERP, BFPP did not influence the research process as such. It should be noted that whereas SERP was a component of BFPP, this thesis does not attempt to answer the same questions as SERP; rather results of SERP are used here as material for evaluating the Participatory Research Approach (PRA).

As background to the thesis on the impact of aid, I will discuss briefly the trends in development aid policy since the 1960's. As the Bura Irrigation and Settlement Scheme (BISS), the scene for the case study of my thesis, was initiallyfunded by the World Bank, I have particularly focused on changes in the World Bank approach. I will also analyze current attitudes towards development aid in Finland.

## 1.2. Changes in the approach to development aid

In its relatively short history, development aid has been approached with various aims, methods and motives. In the late 1960's the 'take-off' model based on Rostow was popular. The assumption that strengthening key sectors of economy with external money would result in a stronger economy and development taking off, led to an approach where identification of 'growth areas' became central (Timberlake, 1985). The Brandt report published in 1983 (Brandt, 1983) expressed the mutual dependency of North and South, and thus helped to justify the growing aid business.

International debate has been concerned with whether aid has been a catalyst to development or destructive to realization of the development potentials of many underdeveloping countries (eg. Hayter, 1981; Midgley, 1981; Chambers, 1983 & 1985; Rondinelli,1983; Hayter et al, 1985; Timberlake, 1985 & 1987 ; Cassen, 1986; Shiva, 1988 ). It has been argued that development aid is being used as a system for controlling "Northern" interests in the underdeveloping world, for example, through maintaining import oriented markets, and strenghtening the role of multinationals in national economies (Hayter et al, 1985).

In the 1970's the World Bank, regarded by some as the foremost aid institution (Payer, 1982), was expanding its loan programme to cover costs of infrastructure development in various sectors (World Bank, 1972). In the beginning of the eighties the experience of the previous two decades was evaluated and the World Bank produced its agenda for the decade (World Bank, 1981). The strategy presented in the agenda focused on:

"a fuller integration into the world economy, with renewed attention to exports and a review of the level and nature of industrial protection"
(Berg, 1986, pg 53)

The Bura Irrigation and Settlement Scheme is a product of the infrastructure oriented investment of the seventies as well as a result of the policy focused on promoting export oriented schemes.

Since 1981 there has already been a change in conceptualisation from accelerated development to sustainable development. Sustainable development is here defined as:

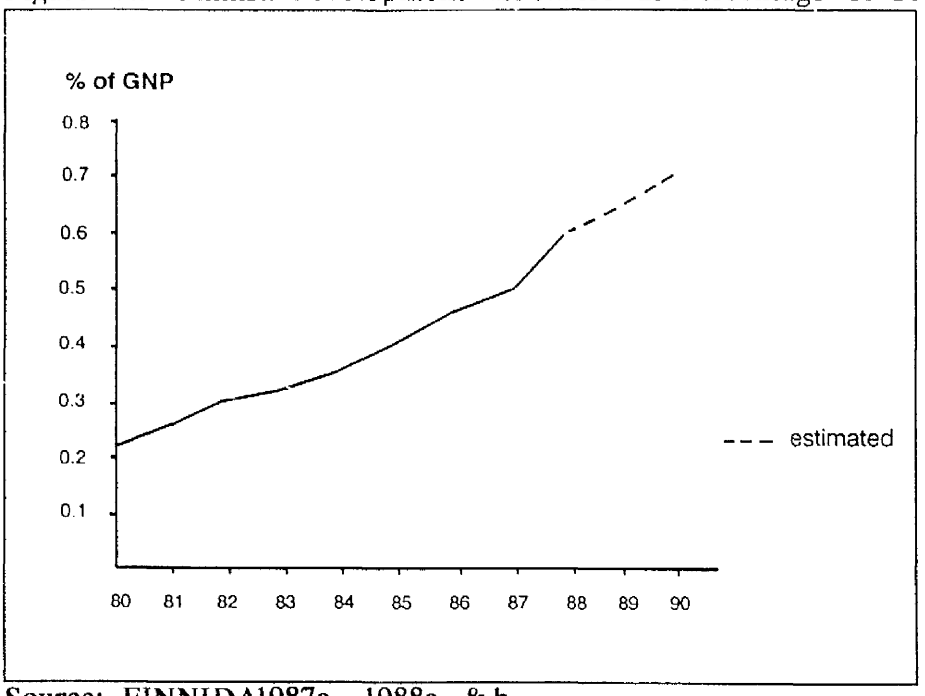
"development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

(WCED, 1987, pg 43)

In World Bank policies sustainable development has meant an increasing emphasis on "basic programmes" in, for example, population growth control, education, environmental management etc (Timberlake, 1985; Green et al, 1986). These programmes have been linked to an increasing conditionality in aid, a process that has also been referred to as colonization as donors (both bilateral and multilateral) have wanted to tie long-term aid to economic and political changes recommended by them (Timberlake, 1985, pg 203).

Changing public attitudes towards development aid in Finland has been reflected by the steep growth of the amount allocated annually to aid in the national budget. Up to 1989 development aid in Finland has increased rapidly both in absolute terms and as a percentage of GNP. In the budget for 1989 the Finnish government almost reached the UN recomended figure of 0.7% of GNP allocated to development aid, totalling FIM 2 491 million. (Figure 1.1.) (FINNIDA,1988b). This aid is directed to fifteen programme countries; Bangladesh, Burma, Egypt, Ethiopia, Kenya, Mozambique, Nepal, Nicaragua, Peru, Somalia, Sri Lanka, Sudan, Tanzania, Vietnam and Zambia (Table 1.1.). In addition bilateral aid is given to specific projects in

Figure 1.1. Finnish Development Assistance as Percentage of GNP (1980-1990)




Source: FINNIDA1987a, 1988a & b

Table 1.1. Programme Countries of Finnish Development Assistance (1987)

| PROGRAMME COUNTRY | AID (GIFT + LOAN) million FIM |
|---|---|
| 1. Tanzania | 150,3 |
| 2. Zambia | 115,6 |
| 3. Somalia | 72,4 |
| 4. Kenya | 63,5 |
| 5. Sri Lanka | 61,7 |
| 6. Vietnam | 52,4 |
| 7. Ethiopia | 51,2 |
| 8. Nepal | 43,7 |
| 9. Mozambique | 42,6 |
| 10. Nicaragua | 32,5 |
| 11. Sudan | 30,9 |
| 12. Egypt | 29,7 |
| 13. Peru | 15,7 |
| 14. Bangladesh | 12,1 |
| 15. Burma | 5,7 |
| total | 780,0 |

Source: FINNIDA,1988b

Indonesia, Lesotho, Mexico, Uganda and Zimbwabwe.

The most important sectors of Finnish bilateral aid are humanitarian aid[1], water Figure and energy management, and forest industries (Table 1.2.) (FINNIDA,1987a & 1988b). However, if support in the forestry sector is combined with support to forestry related industries, such as sawmilling, these together represent over 11% of all aid (Table 1.2.). The Bura Fuelwood Plantation Project (BFPP) is funded within the forestry sector.

Table 1.2. Bilateral Finnish Development Aid by Sectors in 1987

| SECTOR | 1000 FIM | % |
|---|---|---|
| Humanitarian aid | 121,7 | 10.5 |
| Water management | 108,5 | 9.4 |
| Energy management | 105,2 | 9.1 |
| Industry | 101,6* | 8.8 |
| Health | 98,3 | 8.5 |
| Transport | 96,4 | 8.3 |
| Education | 89,1 | 7.7 |
| Agriculture | 71,0 | 6.1 |
| Communication | 68,5 | 5.9 |
| FORESTRY | 62,0 | 5.4 |
| Commerce and finance | 40,0 | 3.5 |
| Mining | 20,6 | 1.8 |
| Public administration | 7,6 | 0.7 |
| Construction | 5,0 | 0.4 |
| Misc. | 160,2 | 13.9 |
| TOTAL | 1155,7 | 100.0 |

* Of this figure 70.4% is within forestry related industry

Source: FINNIDA,1988b

[1] Humanitarian aid consists of disaster aid, refugee aid and aid for freedom organizations (in southern Africa), of which disaster and refugee aid represented some 84% in 1987 (FINNIDA,1988d)

As the proportion of GNP devoted to development aid has risen (Figure 1.1.) in recent years in Finland, the purpose and aims of aid, as well as its effects and use have been increasingly, though not sufficiently, discussed by public.

In the spring of 1988 this discussion was particularly lively in some of the largest daily newspapers of Finland (Helsingin Sanomat, Uusi Suomi, Ilta-Sanomat). The discussion touched on the rapid increase of Finnish aid (Laaksonen, 19.1.88; Paljakka, et al 1.5.88) and on its impact on the environment (Kuusisto, 8.2.88). The two most extensive discussions, however, were on the high cost of Nordic experts in development aid (Helsingin Sanomat 31.3.88, 9.4.88; Ilta-Sanomat 6.4.88), initiated as a result of a report discussing the issue (Forss et al, 1988) as well as the role of aid in development as a whole and specifically technical expertise versus socio-economic expertise in defining development strategies (Aromäki, 20.3.88; Salmi, 23.3.88; Leppänen, 28.3.88; Koivula, 10.4.88 & 30.4.88; Ramsay 19.4.88).

Both of the discussions reflect concern by the public with one central issue in aid. What are the roles of donors (institutions, experts etc.) and the recipients (government officials, peasants etc.) in the process of development of a particular locality. Who does aid serve? Apart from the discussion at the global level about the efficiency of development aid as a means of promoting "development", a discussion at the level of the communities receiving aid "projects" into their "lifeworld" was taking place.

## 1.3. The purpose and aims of the thesis

The purpose of this thesis is to study the impact of a development aid programme on the forestry related resource base of a recipient community at the grassroot level, and the success of participatory research as a tool to development aid. Assuming that at all levels decisions are made and strategies designed according to the resources available to carry out such decisions and strategies, I argue that development aid enters space within which certain resources are controlled by various interest groups and causes changes in that space.

The study is based on an analysis of the impact of a forestry development project on forestry resources of the local community. I will study specifically an aid programme, Bura Fuelwood Plantation Project (BFPP). In this thesis the Bura Irrigation and Settlement Scheme (BISS) is the scene for studying the impact of development aid (BFPP) on the resources (means to implement development strategies) of the recipient community (BISS villagers particularly women). This analysis will help to determine whether a participatory research component can increase, or decrease, the degree of control recipients of aid have over the development of their communities.

Social and economic research projects as components in aid programmes have increased in numbers in the last fifteen years (eg. Cairncross et al, 1980; Launonen, 1985; Feurstein, 1986 Seppälä, 1986). Because of this it is important to ask whose interests does this research serve? (Poutiainen, 1987). Of the components of aid, I want to focus on the potential of research in empowerment of the people to participate fully in decision making (McCall, 1987).

The first hypothesis is that Bura Fuelwood Plantation Project (BFPP) has had an impact on the resources the people in Bura have for creating their own development strategies. This impact is caused by the aid project both occupying and creating space of its own. To assess this hypothesis it will be necessary to investigate the following issues. Firstly, it will be necessary to define the character of space and for this I have developed the concept of Specific Interest Space on the basis of my work in Bura. Secondly, I will discuss the forestry resources in Bura prior to the establishment of BFPP and assess the change in tenant's access to and control over these resources as a result of BFPP.

The second hypothesis is that the Participatory Research Approach can increase the recipients access to and control over resources within the aid-created space thus functioning as a potential means of empowerment. I will start the assessment of this hypothesis by discussing the background to PRA and by developing concepts central to my thesis. It will also be necessary to describe and analyze the participatory research process as it took place in Bura, and the stove programme that grew out of it.

One of the questions I ask in assessing the second hypothesis is; the extent to which the choice of methodology influences the kind of results that can be expected. When geographical research is carried out in a context where a specific aim is to generate development, such as in connection with development aid, this question becomes even more pertinent. Can development geography make use of research methodologies that in themselves are catalysts for development?

Throughout the thesis I have attempted to retain a focus on gender roles in access to and control over tree and forest resources. Although it was never made explicit in project documents, it became obvious during the preliminary research period (October-December 1984) that the main interest group for the fuelwood project was the women. The women not only did the fetching of the wood, they also bought and sold it, prepared it for use, stored it and used it, as well as used other forestry products. It was also clear that major changes in the fuel resources would affect women directly, their workload and life as a whole. It was equally clear that there was no planned opportunity for women to affect the running of the forestry programme, and that if in any way considered it would be as a homogenous target group, rather than an interest group with varied internal priorities.

1.4. Introduction to the case study: Bura Fuelwood Plantation Project, Eastern Kenya

The analysis in my thesis is based on fieldwork carried out in Bura in two stages; a preliminary study in October-November 1984 and the main body of the fieldwork in May 1985 to June 1986. I also had the opportunity to revisit Bura in July-August 1987.

The primary object of analysis in this thesis is a development aid programme, the Bura Fuelwood Plantation Project (BFPP). BFPP is a component of a large scale irrigation and settlement scheme, Bura Irrigation and Settlement Scheme (BISS) in Tana River District of Coast Province, Kenya (Figure 1.2.). BISS is one of the most recent, and most ambitious efforts in Kenya to claim hitherto uncultivable land for agriculture. The Tana River basin (Figure 3.3.) covers about 40% of the total irrigation

potential of the country's surface water systems. Although the potential of the area for irrigation development had been realized by the colonial government as early as the 1930's, it was only after independence in 1963 that actual feasibility studies got under way. In 1977 Kenya and the World Bank made an agreement to start constructing the Scheme. The existing Scheme today represents the first phase of the whole project. The original plan was to settle 5 150 tenant families on 6 700 ha of the west bank of the River Tana, and later to follow up with similar development on the east bank (Republic of Kenya, 1977). Presently there are some 1800 tenant families[2] cultivating 2500 hectares of irrigated cotton fields.

The purpose of the Scheme is threefold. Firstly, it is in part to meet growing landlessness in Central and Western Kenya by settling landless farmers on the Scheme. Secondly, it is to utilize the irrigation potential of the River Tana in order to increase the productivity of the semi-arid land around it. Thirdly, the Scheme also contributes to the national economy through production of export-quality cotton. The first tenants arrived in Bura in 1981, and by 1986 ten villages had been settled with a population of c. 1 200 on average[3]. The agricultural system is based on a rotation of cotton grown for export, and maize grown for subsistence. So far the harvests have not reached expected quantities due to problems with water intake and delayed land preparation, and consequently the financial resources of the tenant farmers are continuously extremely limited.

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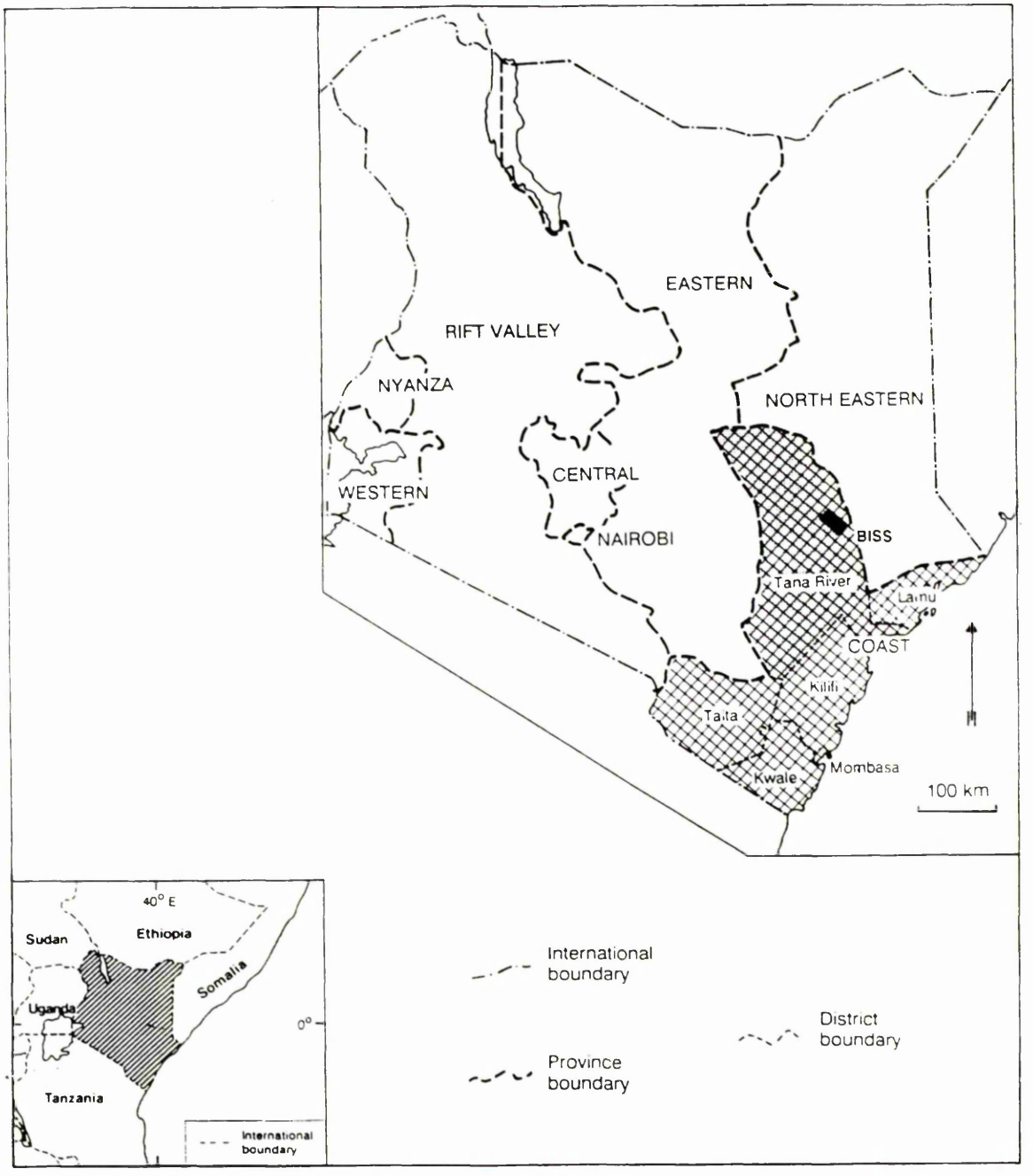
[2] According to the BISS Settlement Office Records there were 1947 tenants in June 1986. According to research interviews there were 1727.

[3] According to the Settlement Office records 1284, according to research interviews 1146.

Figure 1.2. Location of Bura Irrigation and Settlement Scheme (BISS) in Kenya



One of the consequences of the rapid changes in the land-use pattern of the area, and the extensive land clearance resulting from establishment of BISS, is the environmental degradation taking place through extensive decline in ground cover. Among other things this has meant an increased shortage of woodfuels for domestic energy needs. Presently woodfuels are obtained from two sources. Immediately surrounding the Scheme is dry savanna scrub and closer to the river, the riverine forest. This forms a belt of upto 1 km wide along the River Tana (Johansson, 1985). All of these sources are rapidly deteriorating, which is also reflected in increasing distances for firewood collection (Vainio-Mattila,1987).

Attention was paid to the woodfuel situation in the original Scheme plans, with suggestions made for possible alternative sources, but the shortage of woodfuel was not regarded in any way as a priority, as it was not seen to directly contribute towards the agricultural productivity of the Scheme. By 1981 it was clear that the supply of wood fuel from the immediate environment would be insufficient, and that already the ecologically precious riverine forest nearby was coming under high pressure, and the need for a fuelwood plantation project was becoming urgent.

### 1.4.1. Introduction to Bura Fuelwood Plantation Project

In 1981, the Bura Fuelwood Plantation Project was selected to be part of the bilateral aid programme between Kenya and Finland with FINNIDA(Finnish International Development Agency) as the major donor. The programme consisted of three components: implementation of the fuelwood project, Forestry Research Programme (FORP) and Socio-Economic Research Programme (SERP).

The implementation of the fuelwood project focused on irrigated plantation of Prosopis julifloraand institution building within the BISS Forestry Department. The development and implementation of BFPP is discussed in Chapter 5. It should be noted that the implementation of BFPP only started in April 1986 and the first phase ended in June 1987. The first phase was followed by a long interim period until July 1989 when the second phase started.

The Forestry Research Programme was to study the problems of irrigated fuelwood production and the effects of the increasing demands on the riverine forest. In the first place FORP aimed to produce urgently needed information on species and provenance selection, seed procurement, plantation methods, irrigation and production quantities. In the second place it aimed to study the interaction between people and environment. (Johansson et al, 1990)

The Socio-Economic Research Programme (SERP) was initiated to provide baseline information on fuel economy at the household level in Bura, to investigate the possibilities of alternative fuels to woodfuels and other woodfuel saving measures, as well as to study the social organization of the villages and BISS in order to provide background information for the administration of the fuelwood plantation. SERP will be analyzed in Chapters 4 to 7 where the research process is assessed.

### 1.4.2. Relationship between PRA and BFPP

This thesis was initiated within the BFPP structure because of the opportunity this framework offered for evaluating the use of the PRA within an aid programme. There

were from the beginning some problems with this set-up. One is BISS itself: since it is a settlement scheme, the tenants were not as familiarwith their resource base as they would have been in their home areas. The Scheme is also governed by the Irrigation Act (Republic of Kenya, 1967) dating back to when such schemes were used to house political detainees. On the other hand this provided an excellent opportunity for seeing how the tenants' perception of what the resources are is equally important to what the physical resources are. Another problem was that only the socio-economic research component was participatory, not the whole project, thus it was not automatically possible after designing participatory strategies to implement them. However, it was possible to make some comparison between participatory and non-participatory strategies.

### 1.4.3. Women in BFPP

The mobilization of women in groups has a long tradition in Kenya. Historically the groups were mutual assistance groups consisting of family and neighbours and, during the colonial period, often led by a wife of a white settler (Mönsted, 1978). The tradition which was formalized during the colonial period carried on after independence in the form of "Harambee" (sw. for "Let's pull together") self-help groups. Most of the groups are presently involved in different kinds of projects with the aim of generating income to improve the social security of women (op cit, pg 52). Nearly all of the villages in Bura had active women's groups.

### 1.4.4. Stove programme

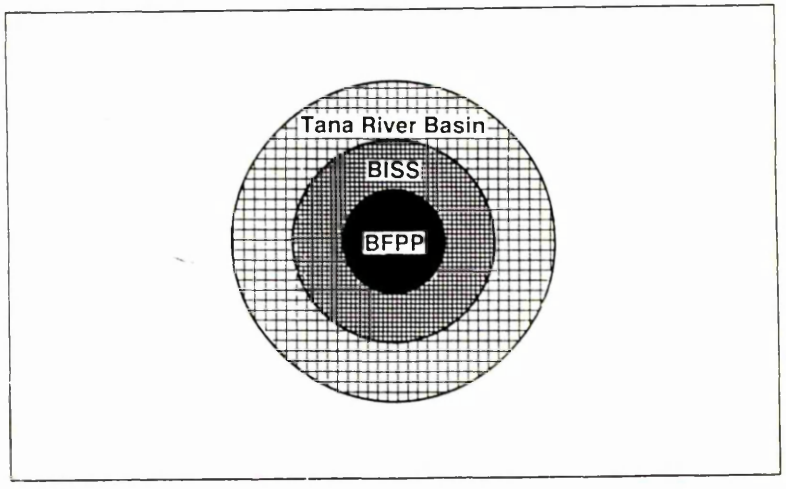
A stove programme was developed as a by-product of SERP. The introduction of fuel

saving stoves was considered important by all involved in planning the BFPP. The project description document defines the aims of the stove programme as follows:

"The Project willsupply the villages with sufficient materials and tools for constructing improved 'jiko' stoves, so that all villagers can familiarizethemselves with their use. The aim is to furnish each village with 10-20 new stoves, and to encourage their use by every possible means."
(Enso-Gutzeit, 1985a, pg 12)

During the research period the role of the stove programme grew, and with this growth the aims of the Project were altered to include the establishment of an ongoing stove programme, which could function also as a means for forestry related extension work in the villages. The stove programme is discussed in detail in Chapter 7.

Figure 1.3. Research Context




Source: Vainio-Mattilafor this thesis

## 1.5. Methodological notes

Participatory Research Approach (PRA)was selected as a research approach in the belief that it has potential for a catalytic role. Research in this thesis is understood as an activity aiming at obtaining and analyzing information in order to produce new knowledge (Bryceson, 1979; Poutiainen, 1987), and participatory research is research based on participation by both the researcher and the researched transforming the traditional object-subject relationship to that of object-object relationship. (Poutiainen, 1987). Methodology refers to a framework including both conceptualization and the procedures on which the construction of the concepts and their use in analysis is based. (Mbilinyiet al, 1979)

In talking about people's participation in this thesis I am referring to the people who are immediately affected by the implementation of an aid programme, who are often perceived as recipients or the target group of the programme. I would like to stress that I do not perceive this group as homogenous, but assume that it consists of various interest groups, whose interests may be anywhere on the scale from in line with the various aid programme interests to being directly opposed to them or indifferent regarding them. By participation I mean a process through which these people can gain and retain control over decisions affecting their life. It is a process of empowerment. In reference to the case study I am particularly interested in what opportunities there were within BFPP for people's participation and thus for the recipient community in Bura to influence forestry strategies in the area.

From the beginning the Social and Economic Research Programme was perceived

as "action-oriented" or "participatory", and it was intended to be an experiment in using PRA within a framework of a development aid programme. Therefore it is necessary at this stage to briefly clarify the methodology used, although this will be discussed in detail later (Chapters 2 and 4).

To some extent, traditional tools of anthropological and geographical research were used, including formal and informal interviews, free communication, and observation, both participant and direct, analysis of soil maps, measurement of firewood consumption and testing for an indication of the amounts of agricultural residue available on BISS for domestic fuel. The most important tool was "networking". By networking I mean dialogue that has been born within and between groups that have formed temporarily or permanently around a common problem.

Participatory Research Approach (PRA) starts from the premise that the research process will, whether it is our intention or not, somehow transform the reality which is the object of the research. In other words, even the most "objective" and "detached" research programme will have this effect. With PRA the people cease to be objects themselves and are acknowledged as subjects of the research who have the ability to participate in the research process and thus have a degree of control over the transformation taking place. Maybe the most important difference between this and more conventional research methods, such as participant observation, is that not only does the research environment change in a year through internally stimulated change, but as a result of the people's participation the research itself aims to cause, and causes, change. Thus in Bura, for example, patterns of fuelwood use

were considerably changed through the implementation of the stove programme, and attitudes towards tree planting and conservation changed as a result of various efforts by FORP and SERP. This was demonstrated for example by the visible change in the villages through tree planting, which was studied by Merja Mäkelä in 1985 (Mäkelä,1987). Tree planting and stoves are also issues which have found their place in songs performed by the women in some of the villages. (Appendix 1)

In carrying out the research I had two or three research assistants. From the beginning the idea was that at the end of my time in Bura they would be able to carry on forestry related extension work on their own. This was reflected in our interview strategy so that the primary function of the interviews was that the research assistants would get to know the villages they were working in. The interviews were structured (Appendix 2), but there were no actual questionnaires, and improvisation was encouraged in order to get a fuller understanding of the life in the villages. This opened up fields of inquiry that had no previously apparent links with the fuel problem. At the same time, data collected in this manner have been difficult to classify according to any traditional classification system.

Stratification was not attempted in any systematically "random" manner. But as the research progressed, the interviewees were selected on the basis of ethnicity, so that all the ethnic groups in the village were represented roughly in proportion to the number of households of each group in the village (For sample size, see Table 1.3. and Appendix 2). Also the sampling included both those who were active in the stove programme and those who were not. When this process was completed, the next

step was to attempt to identify which groups were left outside the stove development and reasons for this.

In identifying people's participation particularly in the stove development programme I used data both from our own interviews and from the BISS Settlement Officer's Office. This information in addition to the information on stove building was put on maps I had prepared on the villages (based on earlier architectural maps). Thus it was possible both to identify parts of villages and ethnic groups not participating in

Table 1.3. Sample Sizes of the Interviews in Bura 1985/1986

| VILLAGE* | NUMBER OF TENANTS** | SAMPLE SIZE | % OF VILLAGE POPULATION |
|---|---|---|---|
| 1 | 160 | 33 | 20.6 |
| 2 | 210 | 41 | 19.5 |
| 3 | 172 | 30 | 17.4 |
| 4 | 155 | 27 | 17.4 |
| 5 | 199 | 30 | 15.0 |
| 6 | 140 | 31 | 22.1 |
| 7 | 161 | 27 | 16.8 |
| 8 | 180 | 28 | 15.6 |
| 9 | 208 | 28 | 13.5 |
| 10 | 145 | 29 | 20.0 |

* The villages have not to this day been given any names and are called by numbers 1 to 10
** This figure is obtained from the village chairman and differs slightly from the official Scheme Settlement Office records

Source: interviews in Bura

the stove development as well as to follow the general diffusion process of the stoves. This kind of map is used in Chapter 7 .

As the stove development became a special focus for the research it also further enforced the role of women in the project. Not only were they primary fuelwood users and suppliers to the households, but also only women used stoves (with the exception of few batchelors). In theory Women In Development (WID) issues have been tackled with various approaches. Prehm (in Kirjavainen et al, 1988) has classified these approaches into 1) women focused 2) familyfocused, and 3) problem focused. Of these only the first is identifiable as a strongly feminist approach with emphasis on functional equity, empowerment and economic goals. It is recognized that women already are contributing and participating in development, but this role needs to be acknowledged and women need opportunities to direct development on their own behalf. Individuals are used as units of analysis with emphasis on gender specificity. The second approach refers to thinking according to which women's main contribution to development is through their role in the household, as a mother. The unit of analysis is then the household. The third approach is known as the basic needs approach, with women usually seen in terms of being producers and providers. (op cit).

In this thesis no conscious distinction was made in the beginning between these approaches. It is clear that the project (BFPP) adopted (although not consciously) an approach somewhere between family and problem focussed, providing women with fuelwood as part of the household and solving the fuelwood shortage from which

women suffer. My feminist conscience was, however aroused through observing this approach which ignored the women as the main interest group, refused to incorporate strategies initiated by the women and remained ignorant of the context in which fuelwood was only one problem. I would now most definitely opt for the first approach. I have attempted to do this where possible, but because of my initial ignorance have had to content myself with keeping most of the analysis at the household level. The central question in the thesis is the impact of a development programme on the resource base of the recipient community. I have tackled this mainly at the household level by using the concept of Specific Interest Space developed as a result of fieldwork in Bura. Resources refer here to the means for implementing development strategies and resource base includes both the physical resources and the perceived resources. For example, when the tenants were allocated houses but no tenure, the houses were not perceived by the tenants as "theirs" even if the Scheme management saw the tenants as responsible for the condition of these houses. The background to household resources is to some extent analyzed in Chapter 3, but more specifically, forestry related resources are analyzed in Chapter 5 and 7, and the impact of BFPP on these is discussed in Chapter 8.

## 1.6. Structure of the thesis

This introduction is followed by a discussion on the theoretical framework of the thesis, including an analysis of the central concepts of Participatory Research Approach and space.

In Chapter 3 I discuss Kenyan national development strategies in the context of the

period of Kenyan independence. One of these strategies, the District Focus for Rural Development, is chosen for special attention because of the potential framework it offers for carrying out bilateral aid programmes within a receiver country strategy. Later in the Chapter, I focus on the physical and human geography of the Bura Irrigation and Settlement Scheme (BISS).

In Chapter 4 I concentrate on the Social and Economic Research Programme (SERP) to give account of the research process in Bura. I will do this to assess PRA as a tool of development through which communities can gain and retain a degree of control, and as a channel for the aid programme to identify the community's priority problems. Some comparison is made to research carried out in Bura with more conventional methodologies.

In Chapter 5 I attempt to establish the resources that are in this thesis used to indicate the degree of change effected by the implementation of the forestry project. The central question posed about the existing resources is about the difference in perception, and thus in actions, of the tenants and the management regarding the availability of, and access to, these resources. The questions asked about BFPP in this chapter are, what kind of new resources does its strategy involve, and whether the new resources introduced through BFPP have enlarged or diminished the resources controlled at the household level to develop fuel economy strategies.

In Chapter 6 I continue the theme from Chapters 4 and 5 but focusing on one interest group, the women. I examine the impact of the Bura Fuelwood Plantation Project on

the household fuel economy and, in Chapter 7, analyze specifically the stove programme as a strategy identified by the women to deal with the deteriorating fuelwood situation.

In Chapter 8 I assess the impact of BFPP and SERP based on the resource analysis in previous chapters. I will argue that the perception of resource shortages define the strategies designed to respond to them. It will be shown with examples in Bura how these project strategies may put pressure on resources outside the shortage sector and fail to respond to the needs as perceived by the communities. It will be shown that participation is dependent on the perception of its likely effect on available resources.

The conclusion will summarize the findings of this thesis and will connect them to the ongoing discussion on the direction to which development assistance should be developed. The conclusion includes an evaluation of the shortcomings and strengths of using Participatory Research Approach within the framework of development aid and discussion on the impact of aid on development.

# 2. THEORETICAL FRAMEWORK: PARTICIPATORY RESEARCH AND SPACE

## 2.1. Introduction

The purpose of this chapter is to clarify how concepts used in following chapters fit into the framework of the current debate on Participatory Research Approach (PRA) and space.

In order to assess whether PRA can increase aid recipients' access to and control over resources it is necessary to first define its central concepts. I have done this by analyzing the main debates within the approach. The following discussion on space is included as background to the development of the concept of Specific Interest Space (SIS). I will develop SIS as a tool for analyzing impact of development programmes on the community's access to and control of resources.

## 2.2. Participatory Research Approach (PRA)

One of the concerns in the discussion on development and development aid has been the degree to which the people receiving aid can participate in the process of development (eg. Midgley, 1981; Chambers, 1983; Midgley et al, 1986; Feurstein, 1986). A problem in this discussion has been that the terminology used is ambiguous. Talking about community participation, for example, it is certain that theorists, donors and recipients all give it a different political and social interpretation. The discussion refers for example to people's participation (Oakley et al, 1984; McCall, 1987), community participation (Motala, 1985; Midgley et al, 1986), people's own development (Swantz, 1986), community development (Gow et al, 1983) and

self-help (Verhagen, 1987).

It has been argued that the theoretical development of PRA has been a collective process (Hall, 1981). This has meant both that increasing interest and co-operation are evident among various institutions within the Western academic tradition, and that from the beginning PRA has had its roots both in the critical movement of Frankfurt in the 1950's and 1960's and, for example, in the unlabelled social movements of rural India (Tandon, 1979). In the West, the emergence of PRA was sparked off by a critique of conventional research methodologies epistemologically based on empiricism, logical positivism and structuralism. Its emergence also reflected a change in development theory towards "alternative" development focusing on efforts towards self-sufficiency in local level development which grew out of dependency theory analysis. As the focus in the 1970's and 1980's has increasingly been on local level self-sufficiency, there has been a parallel trend towards emphasis on qualitative factors of development. With the linkage of participation and power to control of resources, the obvious questions have been directed at the aims of research (Swantz, 1976; Poutiainen, 1987).

The fact that in the case of Bura, the Social and Economic Research Programme (SERP) was the only participatory element in the project was often an obstacle to continuation of the participatory process to empowerment and, raises questions as to whether it was a realistic choice of methodology. It should be borne in mind though that in the early 1980's when this was being planned, participatory approaches were still relatively new and underdeveloped in the context of development aid. In the end

of 1980's participatory and action methodologies have developed into numerous, more focused methodologies such as: Diagnosis and Design, Farming Systems Research, Rapid Rural Appraisal (Raintree, 1984; Khon Kaen University, 1987; Molnar, 1988; Bruce, 1989)

Also the understanding of the issues relating to community and popular participation has brought a new focus on Local Technical Knowledge (LTK)(Davis-Case, 1989; Falconer, 1989; Fisher,1989) and through that a focus on a process based on existing local institutions, aiming to strengthen their capacity, thus developing a sound foundation for real participation of selected interest groups.

The focus on gender roles and Women In Development (WID) has contributed to participatory development an understanding of heterogeneity of interest groups and the need to focus specifically on the needs of the poorest, women, landless, young and old.

With the critique of the positivist social sciences it was possible to reject the tradition of social science research based on natural sciences. It was argued that the principles of causality that function in natural sciences are not necessarily applicable in social sciences due to their distinct ontological characteristics (Borda, 1987). Borda further argues that whereas in nature principles of action and reaction are more direct and closed systems predominate, in the social sciences we are dealing more with open systems where the processes are of spiral structure feeding into their own development or movement thus creating forms of cause and effect not manifested

in nature.

Methodologically the dependence on natural sciences is reflected in the use of "cross sectional" analyses, developed for use in natural sciences and applied in social sciences (eg. multivariate analysis). Epistemologically this kind of analysis enforces the idea that reality can be constructed piece by piece and ignores its "temporal and processual dimensions" (Borda, 1977)

The critique outlined above has led into three main debates within PR framework: the dichotomy between practice and theory, the process of production of knowledge and the role of the researcher.

2.2.1. Practice vs. theory

One of the main debates in theoretical discussion on PRA is that on the roles of theory and practice. On one side of the debate are the researchers who argue from within a historical materialist tradition. They insist on an explicit theoretical framework, and a researcher's identification and interaction with the oppressed being studied. They also would blame the so called PR practitioners of naive pragmatism who do not recognize the role of theory and ideology (Bryceson et al, 1979; Mbilinyi et al, 1979; Rudqvist,1979).

Bryceson (1980) in her critique of the PRA takes the position that

"PRA's emphasis on the researcher's democratic identification and interaction with the

oppressed peoples he studies are absolutely essential conditions for conducting research which has as its expressed aim progressive social change"
(Bryceson, 1980, pg 10)

but that

"Those who use the PRA and adhere to its tenets fail to take cognizance of implicit theory underlining their research work."
(Bryceson, 1980, pg 10)

She argues that PRA is primarily born out of the philosophical tradition of pragmatism, but that it is also simultaneously susceptible to idealism and empiricism, and that the influence of these conflicting philosophies has meant that PRA produces practical solutions to everyday problems rather than theoretical concepts "capable of more powerful clarification of the social reality". According to Bryceson this latter kind of theoretical production would be possible by adopting an explicit methodological and theoretical framework, that of historical materialism.

On the other hand there are those who, from the historical materialist point of view, do not see political activism as a necessity and who feel, while recognizing that no researcher starts from a tabula rasa situation, that a commitment to an interpretation restrained by a specific theoretical framework may jeopardise analysis. (Anacleti,1979; Tandon,1979; Rahman, 1983)

Swantz (1980) justifies her position in the second group in her answer to Bryceson by pointing out that

"research conducted in a developing community in the midst of planned change cannot be unrelated to that process of change".
(Swantz, 1980, pg 20)

and furthermore that

"PRA is an attempt to create a research approach which would grow out of the new social situation, would not separate theory and practice, would arise from practical problems and would serve the transformation process of a postcolonial society."
(Swantz, 1980, pg 29)

Orlando Falls Borda (1977, 1987) sees theory and practice (or knowledge and action) as absolutely inseparable, and consequently argues that object and subject of research cannot be separated either. However, whatever the actual relationship of practice and theory, it is evident that it is this dialectical process of continuously reviewing practical experience in the light of theory that is rapidly building a body of participation theory. (Pearse et al, 1979)

When PRA is used in the sense of aiming at a structural change away from the dominating classes, an explicitly held political standpoint is important (Rudqvist, 1979). This change can only be achieved through

"integrating theory and practice, by a union of theoretical understanding and practical political action."

(Rudqvist, 1979, pg 5)

From the viewpoint of pragmatism, and this largely serves as a foundation for this thesis as well, the important factor is that the research problem is defined by the needs that exist in the social reality in which the research is carried out.

2.2.2. Production of knowledge

Another idea central to PRA is related to the production of knowledge. One of the criteria that validates PRA as a separate approach to scientific inquiry is that it is based on the assumption that knowledge is produced as a social process. It is not an a priori approach, but rather one where the development of a research framework needs to be based on the social reality of the research context and then made explicit.

Borda (1977) has argued that oppressed people can both create and possess knowledge that is scientifically valid, when that validity is determined in terms of praxis. In this vein Gramsci's idea of rejecting philosophy (and knowledge) as something that belongs to only a small category of academicians is embraced.

"'Facts' produced by researchers are therefore also problems with respect to how and why they are produced"

(Mbilinyi et al,1979, pg 2)

Participation can be seen in two ways. When people's participation is desired in order to enforce status quo it is "instrumental" or "interventionist", and on the other hand when people's participation means an increase of opportunity to make changes it can be termed "empowering" (Oakley et al,1984) (Table 2.1.)

McCall (1987) takes the definition further and distinguishes between three kinds of Peoples Participation (PP):

1. PP as a means to facilitate and lubricate outside interventions and policies which are selected by higher level authorities (state, region, or party)

2. PP as mediation, that is as a means to modify and guide and redirect higher level interventions and centralised power so as to more genuinely reflect local needs, aspirations and resource constraints.

3. PP as empowerment of the weakest rural groups - power in terms of access to, and control over, resources and in terms of the social distribution of the resources. (McCall, 1987, pg 1)

Of these the first reflects a traditional attitude to extension, where the expertise is regarded to be outside the community and the participation of that community stops at being taught. The second type of participation reflects the attitude adopted in principle today by most development aid organizations. Donor agencies are willing to provide technical expertise as well as policy making advice to the recipient

Table 2.1. Types of participation

| instrumental/ interventionist | empowering |
|---|---|
| -mobilization of people<br>-participation in an input to development | - spontaneous group activity<br>- collective reflection<br>- self-reliance<br>- active involvement |

Source: Oakley et al, 1984

government. They acknowledge the existence of valuable information at the grassroot level and the importance of people's participation in problem identification, but function through established social order and implement solutions identified from outside.

It is the third kind of participation that I want to focus on. In order to understand more fully the basis of the empowerment of those sectors of society traditionally without power over resources or their distribution, I would like to discuss the concept of the "organic intellectualism" (Gramsci, 1971). Gramsci identifies organic intellectualism as arising from actual situations rather than being brought from outside. In discussing this, Hall (1981) differentiates between three expressions of organic intellectualism. Firstly, it can be seen as "the collective expression of the consciousness of the working class through its own social organization". Secondly, it can be expressed by individuals of the oppressed groups whose political consciousness and technical

knowledge have been born out of struggle ("of which PR may have been the means"). Thirdly, an organic intellectual can be someone essentially from the outside, who has been "radicalized" through taking part in the same struggle (Hall, 1981, pg 35). The antithesis of an "organic intellectual" is a "traditional intellectual". According to Gramsci these were for example, people such as priests, lawyers and other members of the "petite bourgeoisie".

We can also, as Harre (1981) does, look at production of knowledge in terms of the philosophy of science and the production of facts. He differentiates two traditions of scientific thought; positivism and realism. Positivism, he argues, represents a tradition where theory is reduced to its logical structure which then is regarded as the probable description of a pattern. For realists, on the other hand, theory and praxis are interdependent. Theories are understood to be "descriptions of mechanisms which might be responsible for observable patterns of events and properties of things" (pg 3). In realism then, theory becomes central to human science inquiry as they have a capacity to explain unobservable phenomena.(Harre, 1981, pages 3-4)

In this thesis I have attempted to place the discussion within the tradition of realism. To adopt a positivist, or logical empiricist, point of departure would mean not being able to use what above was defined as organic intellectuality, because such knowledge, born out of experience rather than experiment, does not lend itself easily to reductionist analysis, and thus to the creation of positivist theory. On the other hand when, as in realism, theory is at the centre of the inquiry, any analysis is deepened by the contribution to its content by different kinds of knowledge.

PRA functions through intercommunication, or networking, among those bound together by common problems. It is this intercommunication that becomes the primary tool for identifying solutions (Swantz, 1982). As the focus of discussion in PRA has been emphatically on identifying problems, some have felt that there is a need to shift this focus to identification of resources (le Boterf, 1983).

### 2.2.3. Role of the researcher

The main shift in the power relations from traditional social science research to PRA is that of a shift from subject-object relations to subject-subject relations. In traditional research a differentiationbetween the researcher and the "researched" is maintained through enforcing professional control of production of knowledge, planning and use of knowledge. In PRA it is of tantamount importance that the "researched" are not seen as objects of study, but are actively involved in the whole research process (Poutiainen, 1987, pg 76).

What generally is agreed among PRA proponents is that scientific research is linked to political power, and a manifestation of this is production of new knowledge. Although the degree of the importance of political commitment varies it follows that the role of the researcher becomes crucial.

"... the researcher or the scientist cannot take refuge in the role of a social science 'expert' or as a specialist of wisdom. The social scientist willbe militant,involved in the process of social change to which he or she can bring specific and necessary instruments for work." (Darcy de Oliveira, 1975, pg 11)

Thus, whereas in the use of participant observation the communities observed have been described as "victims of unilateral, scientific exploitation" in PRA the researcher becomes a part of the universe of observation (Borda, 1977). However, Borda also warns of the danger of "masoquismo populista", where poverty is idealised by the researcher and is perceived of being of a higher moral order (quoted in le Boterf,1983).

I have already implied that I find the concept of "people" a difficult one, and the "oppressed", the "poor" or the "peasants" are no more helpful. The main difficultywith these concepts is the underlying assumption regarding the homogeneity of the groups referred to. Within the framework of historical materialism, the oppressed belong to the following three groups: firstly, the peasants (they own the means of production), secondly, the proletariat (who sell labour) and thirdly,the lumpenproletariat (who do neither). In identifying those people who should be the partners of development aid at the recipient end, this division is not particularly helpful.

A case from Zambia where women farm mainly for subsistence and men for marketing, is an example of how difficultthe identification of target group can be. As a result of a policy aimed at boosting national resources the attention of planners and aid donors focused on supporting so called "emergent farmers" for expansion of market production. This strategy is seen as production oriented support to the poor, but it was impossible to define the "emergent farmers" or the "poor". (Pausewang,1987)

In the following section I willgive some examples of PRA activities. This willshow that the context out of which PRA has developed, and is developing, is one of diversity in terms of geography, time and fields of problems.

## 2.3. A critique of Participatory Research Approach

During the past two decades different schools on participatory approach have simultaneously been born out of different historical contexts around the globe, and now the approach benefits from a large network of programmes contributing to PRA thought.

"It must be stressed that PR by its very nature is applicable to any and all social conditions and national contexts. In other words there are no 'ideal conditions' under which participatory research operates"
(Bryceson et al, 1979,page 9)

In Latin America, in the early 70's, Paulo Freire conceptualized an approach he referred to as "conscientization". This approach was one of participatory pedagogics. His work arises from a growing awareness of a need for conscientization and radicalization of the oppressed through adult education programmes. He aims at a pedagogy designed to empower the oppressed (Freire, 1972). He makes a strong link between language and politics expressed in education (another example of this, quoted by Walker, is the Soweto uprising), and aims at making the politics in education explicit. Although Freire himself can be seen as a contradictory figure who does not find conflict between christianity and marxism, his influence on the development of PR is undoubtable (Walker, 1980).

From this pedagocical approach to participatory development have developed various participatory training methodologies. An example of such is the Participatory Monitoring and Assessment (PAME)approach developed by Davis-Case (Davis-Case, 1989 & 1990). This genre of approaches are directed at both involving rural men and women in the process of planning, implementation and evaluation of interventions through the application of a number of tools that facilitate the process of negotiation between outsiders and insiders. The evolution of such approaches (that is, ones with specific participatory "tools" or techniques) has led to the development of training that is particularly directed at people working directly with rural communities, such as extension workers, and aims at increasing their capacity to use these tools. Although there is widespread recognition that participatory training is an essential element of participatory development (Bhasin, 1990) a problem is that while field level staff is being trained in participatory, bottom-up approaches they often carry out their work in a framework of top-down planning.

Other developments of the participatory approach were approaches such as "militant observation" developed by the Darcy de Oliveiras (1975), "activist observation" referred to by Stavenhagen and Kassam's "anthropocentric approach" all quoted by Bryceson (1980). All of these approaches added elements of participation of those traditionally considered as objects of research, and questioned the role of the researcher as an objective observer in conventional development research.

One of the first to write on "participant research" was Dr Marja-Liisa Swantz (1976) who had been involved in action research programmes in Tanzania in the early

1970's. She was also a key person in the formation of the "Working Group on Participation and Needs" of the European Association of Development Research and Training Institutes (EADI), which has been central to the evolving perspective of Participatory Action Research (PAR). In 1984 the working group held a meeting in Geneva where experiences from Colombia, Denmark, Finland, Germany, Mexico, Nicaragua and Norway were shared as well as theoretical implications of these experiences discussed. (EADI,1987)

In the late 1970's (1975-1979) a major Finnish research effort led by Dr Swantz was carried out in Tanzania to test the participatory approach. Jipemoyo, as the project was called, was a cultural research project realized by a multidisciplinary team (sociology, ethnology, history, social anthropology, ethnomusicology, comparative religion and geography) aimed at studying the process of change in a village situated in the Western Bagamoyo District of Tanzania. The original aims of the Jipemoyo project were modified through the research process. Jipemoyo was to analyze the role of culture in the process of change and participate in the process of development and socialist construction. It was also to systematize documentation of cultural material and develop training of Tanzanian and Finnish scholars, as well as village officers, in participatory research.(Swantz, 1977)

In 1977 ILO initiated as part of their World Employment Programme a component on "Participatory Organizations of the Rural Poor". This programme has developed participatory research in, for example, Chile and China (Bhaduri et al, 1982). Research in the field has been supported by various organizations among which UN

subsidiaries number. In 1980-1983 UNRISD initiated a research programme on people's participation in development which involved field research in Bolivia, Brazil, Chile,Colombia, Guyana, Nicaragua, Mexico, Peru, China, India and Thailand, and which produced a significant contribution to PR theory (Fenn, 1985).

In FAO the Community Forestry Unit of the Forestry Department has a programme "Forests, Trees and People" (FTPP) which was developed on the basis of an earlier effort of "Community Forestry for Local Development". FTPP was first begun in 1986 and has focused on development of appropriate participatory approaches to forestry activities, as well as horizontal and bottom-up communication. (Molnar, 1988; Bruce, 1989; Davis-Case, 1989 & 1990;)

An obvious criticism of studying participatory approaches within the framework of development aid is that which says that aid represents a stage in the continuous exploitation of the underdeveloping regions in the succession to colonialism, hence it can never be a participatory process. I would argue, while accepting the position of aid in the historical process, that participatory approach does not only function in ideal conditions and that it should be possible to develop aid in such a direction that it will be possible for a (more) participatory process to take place. Increasingly a view is expressed for community participation in aid negotiations from identification and planning to implementation and evaluation. (Roundtable Discussion, 1988)

Zevenbergen (1984) distinguishes four constraints to participation in official development aid: 1) conceptual 2) technical 3) administrative and 4) political. By

conceptual constraints he refers to the inabilityof technocratic language and practice to conceptualize concepts such as "participation". Technical constraints are defined as inflexibilityin accepting recipient preferences, and administrative constraints refer to bureaucratic maze usually associated with official aid. When poverty is directly responded to it results in political action and within the framework of aid this can be seen as foreign interference. This creates political constraints for participation. (Zevenbergen, 1984)

These constraints were also manifested in Bura. As willbe seen later BFPP interpreted "participation" mainly in terms of labour for forestry activities. The forestry technology used to implement the project was sufficiently sophisticated to exclude villagers' participation and the project remains a structure outside the Scheme thus maintaining all decision making power in expatriate hands.

Apart from the problems of a situation where participatory processes are attempted within non-participatory structures, I would say PRA has some inherent problems. As I already earlier mentioned, during the 1980's PRA has developed into various more specific research approaches. This, in my view, has been a response to a definite weakness of research techniques that could be identified as characteristic of PRA. Today it is possible to see rapid appraisal systems and other techniques used for participatory research, but even now literature on the actual processes of developing participatory activities is very small.

At the time when I was selecting the research methodology it seemed more important

to have an approach that would give opportunity for participation by the Bura tenants in the development of the area, than to be particularly concerned with exact data, or even control of the research process. In retrospective it is likely that, knowing the present stage of methodological development, I would have wanted to base development of participatory (extension) activities on a basis of more specifically defined research methodologies, such as Rapid Rural Appraisal or Farming Systems Research. The topics for the research I would still have attempted to base on a participatory assessment of resources and needs.

## 2.4. Space

An assumption I stated in the first hypothesis is that BFPP has had an impact on the forestry resources of tenants in BISS and that this impact is caused by the aid project both occupying and creating space of its own. Space has become an increasingly popular tool in analysis of development among non-geographers. For example, anthropologists use "cultural space" and space as "distance between categories" (Swantz, 1987). This is a reflection of the centrality of the concept of space in social sciences.

Giddens (1979) links social change inseparably to time and space, and asserts that neither temporal nor spatial attributes have been sufficiently incorporated into social theory. In my opinion, however, there is a difference of perspective in sociological social theory from that of geography applied here. This difference is reflected in sociologists attempting to explain an individual's, community's, actor's actions with spatial relations, so that spatial relations are seen to represent and reproduce social

relations. This perspective is largely based on the Durkheimian view of spatial differentiation. (Moore, 1986, page xi)

As will later be discussed, the case study of this thesis is a situation in which, with the creation of an aid programme, control of resources changes. In other words, as a result of changes in social relations, spatial reorganization occurs.

Space in this thesis is defined as a function of control and distance, where control refers to power to make decisions and distance either, or both, to physical distance between objects or a perception of distance. This definition of space presumes a subject. Concretely, in the case study, this means that spatial analysis of resources is carried out in terms of accessibility, which has both an objective element; eg. distance to forest plantations and nurseries or difference in financial resources and costs of plantation products, and a subjective element; eg. perception on who controls tools or who is suitable labour (and at what cost) on the plantation (in other words, who is perceived to have the power to make these decisions).

In literature on development little attention has been paid to its spatial aspects, and when the focus has been primarily spatial, space has been viewed as a "container", or stage for human action. Mabogunje argues that development actively creates and organizes space at all levels from national to individual household space, thus representing various degrees of power sharing and decision making (Mabogunje, 1980, pg 53).

More specifically than development, he sees technology as a space creating factor. Mabogunje refers to Merrill's definition of technology as "cultural traditions" developed as a tool of relating to environment (Mabogunje, 1980, pg 206), and Sitari refers to Carol who sees technology "as the means by which culture plays the role of an active variable in man's relation to his physical major component of technology transfer, both technology and environment" (Sitari, 1988, pg 13). She enforces Carol's view of technology in geography as a means of controlling the natural and cultural environment (op cit, pg 10).

### 2.4.1. Space in geographical literature

In geographical literature David Harvey (1969,1973) is attributed with distinguishing three kinds of space. I understand his concepts as follows: **Absolute space** denotes an object which is contained within space. In other words it is definable within borders which can be marked with co-ordinates. Absolute space exists independently of other objects or matter. **Relative space** exists only on the condition that there is a relationship of comparable elements between at least two different objects but does it does not contain that relationship. For example, if there are two mountain villages at different altitudes, one of them is lower only because the other one is higher, but both of them have an altitude. Both of the villages exist within absolute space which they occupy, that is their location. Their relative spaces are defined by the existence of the other village, and a study in this sphere could, for example, focus on the impact of the relative locations on forms of village organization. **Relational space** also exists only when a relationship exists, but it contains and represents that relationship. In the example, a study on the trade relations between the two villages could be

conceptualized in terms of relational space.

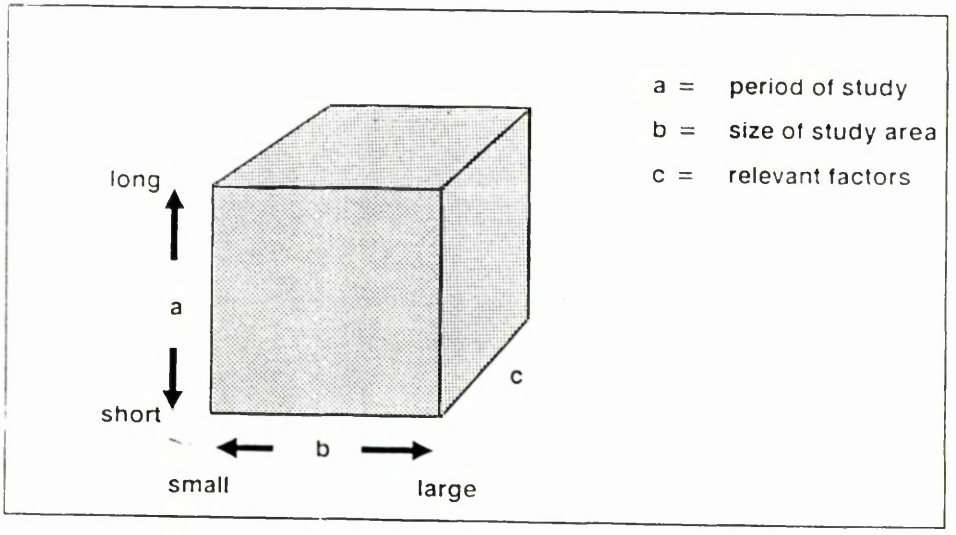
Of these, it is the dynamism of relational space that proves most useful in analysis of development, explaining space as a result of interaction and relationships (Sitari, 1986 & 1988). One problem with this concept is that whereas the other two, absolute and relative, are described in quantifiable terms and are positivist in character, relational space as a concept interprets phenomena that are not easily represented through quantification as they may be partially defined by factors other than material, such as perception or relationships.

A conceptualization of "lifeworld" (Lebenswelt) in phenomenological explanation of communication within a community is useful in discussion of the tenants' experiences on the Bura Scheme. The subjective approach of phenomenology is also fundamental to Participatory Research Approach. The concept of "lifeworld" was originally developed by Husserl, but here I have adopted Habermas' view. According to him lifeworld consists of the various experiences and their interpretations by the members of a community, which are presupposed by those members as background knowledge (Habermas, 1981, pg 13). Phenomenological tradition has been relevant also to some social geographers (Jackson et al, 1984). The contributions of this philosophy to understanding differences between natural and social sciences are many, particularly in terms of seeing the social world in terms of "meaning" rather than "social facts" (Wolff, 1978; Haralambos, 1980; Jackson et al, 1984).

In addition to viewing space as a stage or a container for social activity, it can also be

seen in functional terms. Chisholm does this when he discusses structure of inquiry in terms of the relationship between time, space and relevant factors with the help of a diagram (Figure 2.1.) (Chisholm, 1982). He identifies a general approach to research on development, and although he attempts to isolate the factors that are relevant to development, his model does show that the scale for study is flexible and not bound to a certain level of comparison. If, instead of relevant factors, we were to see his "box" as the total problem we are aiming to solve, then 'c' could represent the relevant questions we must ask. In this way the fundamental definition of the discipline would depend on what kind of questions are asked, not on what kind of methodology is used.

Figure 2.1. Structure of Inquiry




Source: Chisholm, 1982

2.4.2. Political dimension of space

Political geography focuses on

"those aspects of geography of politically organized areas which are relevant to the existence and effective functioning of the areas concerned as political entities both internally and in their external relationships."

(Boateng, 1978, pg 6)

Mostly, although not by definition, these studies concern political entities at the order of state.

In this thesis space is viewed as a resource. Furthermore it is viewed as fundamentally "subjective" in character. While accepting that space can be seen in terms of measurable distances, or areas within commonly recognized boundaries, I am here interested in people's perceptions of the kind (size, field, powerfulness etc) of space they occupy. I have already defined space in terms of control and pointed out the usefulness of conceptualizing space as relational, rather than relative or absolute. Consequently, whereas Boateng (1978) would argue that it is natural that the focus of political geography should be states and countries as these are the units which generally exercise political power, I would argue that this is a narrow view of politics and power, as well as unhelpful in understanding underdevelopment at orders of smaller units than countries or states. Rather a political spatial science should focus its analysis to a greater degree on the relationships between spaces defined in terms of control and distance.

Control is an aspect of both space and development. In the following I have summarized the argument on development as a space creating and organizing process.

### 2.4.3. Specific Interest Space (SIS)

The concept of Specific Interest Space (SIS) is developed in this thesis to facilitate the understanding of space, in terms of control and distance, from the view point of a group of people sharing a common interest. It is used here to denote space differentiated by both its subject, as well as by forces and processes that cause that space to exist, and the possessory subject of control, for example expert's space or women's space.

Earlier in this chapter the role of researcher was discussed. I would like to suggest that the counterparts for the researcher are the various interest groups in the local community. By **interest group** I mean a group of people who either have, and can afford, an active interest in the object of research, or a group of people, who would need the benefits of the development efforts, but who cannot afford an active interest.

In this section I have identified some Specific Interest Spaces central to the spatial analysis of a development programme. Out of several possible interest groups that could have been used to illustrate SIS, I have chosen "people's space", "expert's space" and "women's space". The first two were chosen because of the juxtaposition often applied to the roles of the actors in these groups, whether this juxtaposition is real or false, and also because in development "parlance" both "people" and "expert"

have acquired specific meanings not necessarily related to representativeness or to expertise. I feel that it is important to focus on "women's space" separately because, firstly, despite the heterogeneity of women as a group they are the main interest group for this case study. They are the persons in the households most likely to be responsible for domestic fuel economy. Secondly, I am to highlight the differences between women's interest in forestry related activities and their perceived interest on behalf of the project. And thirdly, I also have a personal interest as a feminist in making women more visible in geographical research.

I would note, though, that these categories are very general and that it would be possible to subdivide these specific interest spaces right to the level of a specific interest space of an individual.

People's space

As was discussed in the section on "Production of knowledge" the concept of "people" or "grassroots" is not clear. In this thesis at a general level it refers to recipients of aid at the level of implementation, or specifically to, for example, the tenant farmers of the Bura Scheme, the riverine farmers and satellite population of the Scheme.

It has been argued by Swantz (1987, pg 2) that people's space is not so much to do with ownership of means of control, as with what they can "appropriate and relate to". I have tried to focus on how this space in which people make decisions regarding their daily life is affected by the aid project.

In his discussion on the culture of expertise, Pacey (1983) defines two spheres; user sphere and expert sphere, which make up what he calls a "map of technology-practice". In the middle of this map is a triangle with three aspects of technology-practice at its points: cultural, organizational and technical. Of these the first two are situated in the area where the two spheres overlap. It is not suggested here that "space" and "sphere" are synonymous. Rather it could be said that sphere is a narrower term denoting a portion of anyone's space. For example, an expert's sphere is within expert's space in that it only covers the space of her/his expertise. Using Pacey's terminology, an expert is likely to be a user in another field of expertise. In Pacey's analysis it is the way he defines the subjects of his spheres that is relevant to this discussion on specific interest space.

He defines "user" as

"all those outside industry who operate equipment; who consume energy, food and water, and who make use of medical services."
(Pacey, 1983, pg 49)

Although his discussion is on technologies, the factors that he places within the user sphere, and which affect the cultural and organizational aspects, are factors which possibly could be said also to partially constitute people's space. These factors are, for example, community/family, individual, personal experience, awareness, belief in progress, creativity and experience.

Pacey explains further the peripheral position of the user:

"We have noted a consistent tendency, indeed, for experts to see only those parts which are of direct technical interest. They reduce the globe to an "expert sphere" which they know in detail, leaving a completely different view - a "user sphere" - which they ignore".

(Pacey, 1983, pg 50)

Expert's space

An expert in the context of this thesis is specifically somebody who is perceived to have expertise or knowledge regarded as essential for development. In the case of the Bura Project the experts are represented by the staff of the forestry department, the staff of the aid project and the various groups of people who have been involved in the planning of the project. This concept could be further subdivided to specifically deal with for example "expatriate space" and "forester's space".

Expert's space is ontologically the same as people's space. The important aspect is their pragmatic differentiation in terms of how the space (=control and distance) exists and manifests itself. In terms of creation, the space occupied by an expert is similar to that of technology transfer discussed by Sitari (1988). She argues that technology transferred in aid projects can create new spatial patterns in the recipient area by being an excuse for setting up parallel organizations and structures to those

already existing, which can be both functionally and often technologically similar, but whose resources are less (Sitari,1988, pg 25). As a result of this, she goes on to argue, the aid project may actively underdevelop the existing organizations by taking on tasks previously carried out by the local institutions, even if at a smaller scale (op cit, pg 27).

Expert's space in development aid programmes is also usually created through an introduction of an outsider, be the Technical Assistance Personnel (TAP) expatriate or national.

Women's space

In the context of rural development in Africa, it is commonly acknowledged that women's contribution has been largely ignored until recently, and that in terms of economic, social and cultural values this contribution is so distinct from that of men, that the concept of "man", as in "man and environment", "man and agriculture" and so on, has no generic meaning (Swantz, 1985; ILO,1984; Moore, 1986). It has also been argued that "Women are hidden from geography" (WGSG, 1984). This has two meanings. Firstly, it refers to studies in geography on women, which so far have concentrated on the role women play in the society in terms of adjustment to a male dominated and determined order (WGSG, 1984, page 20). Secondly it refers to the slow acknowledgement of the existence of feminist geography, which has been defined thus:

" a geography which explicitlytakes into account the socially created gender structure of society; and in which a commitment both towards the alleviation of gender inequality in the short term and towards its removal, through social change towards real equality, in the long term, is expressed."
(WGSG, 1984, page 21)

In Finland a recent doctoral study (Kivikkokangas-Sandgren, 1989) has made a contribution to "finding" women in geography by studying early women geographers in Finland. She uses time geographical methods to trace the lifepaths of women geographers in the early 20th century. She concludes that although roughly equal numbers of men and women studied geography very few women were later awarded with academic posts. The author herself was only the fourth Finnish woman geographer to gain a doctorate in the discipline.

During the United Nations Women's Decade (1975-1985) (United Nations,1985) strategies were designed that would allow for the increased role of women in decisions that affect their lives, for example:

1. special projects/programmes for women
2. special structures for women, including national machineries
3. giving women access to and control over resources
4. organizing and conscientising women

Source: ILO,1984

Allthe member states of the United Nations are committed to the Nairobi Forward

Looking Strategies, and the implementation of these strategies is supervised through national donor agencies and DAC (Development Assistance Committee of OECD).

As special women's programmes have mushroomed, it has been realized that of the strategies mentioned above number three seems the most difficultto implement. And yet, the power of the women's groups depend on their autonomy. In a comparison between women's church groups in the West Indies and the women's party wing in Vietnam, it was found that they both labour under equal constraints of not controlling resources and consequently lacking decision making power (Jain, 1984).

So why is it necessary to differentiatebetween women's space and people's space? Firstly, in the case of Bura women are a specific interest group, as they are the main users of fuelwood. It is argued that due to women's contribution to rural development, they should be regarded as a separate interest group in any analysis of rural development. Secondly,it is argued that women belonging to the different groups of "people","experts" or "technocrats" may share the aims of feminist geography, and thus may share a conceptual space.

## 2.5. Conclusion

Participatory Research Approach is an approach which is still rapidly developing as material is added to its theoretical body from numerous research programmes, networks and organizations involved in using and developing the approach. Of particular importance to my own work is the understanding of participation as a means of empowerment. However, it must be admitted that in terms of the work carried out

in Bura, only in the case of creating the strategy for the stove development were the women participating able to use the research process for their own empowerment.

Participatory Research Approach functions on the terms of the research process created by its subjects. Therefore it also functions in circumstances less than ideal. It is adequate that the circumstances are such that relationships between the subjects can develop. Although aid itself can contribute towards underdevelopment, participatory research may be a tool for reversing this.

In this chapter I have also defined space as essentially subjective, a function of control and distance, for the purpose of analyzing the impact of a development aid programme on the resource base of the recipient community. Using Harvey's terminology, the focus of the thesis is on the relational spaces of the BFPP, the aid programme and the Bura community. Quantifying this relationship maybe difficult,but it is demonstrated later ( Chapter 8) how degrees of control and actual distances, as well as perceived degrees of control and distances, affect decision making of individuals within the community. When these perceptions are shared within groups inside the community, or the community as a whole, a shared space exists which could be described in terms of "lifeworld" as it is defined by habermas (1981). The study of this relational space is necessarily also a study of the political relationships when control is considered as a determinant of space itself.

It is my intention to develop the concept of Specific Interest Space to facilitate the analysis of relational space. Specific Interest Spaces are primarily distinguishable by

the subject of that space. In this Chapter I distinguished between three Specific Interest Spaces. Of these, "people's space"and "expert's space" are general categories, while "women's space" is more specific, and arguably a subcategory in both of the others.

In the following chapter I willelaborate the background to the case study. I willdo this by focusing on the factors that contributed towards the development of Bura Irrigation and Settlement Scheme and on the physical and human geography of the area.

# 3. KENYAN DEVELOPMENT STRATEGIES: DEVELOPMENT OF BURA IRRIGATION AND SETTLEMENT SCHEME

## 3.1. Introduction

In this Chapter I will first outline Kenyan national development strategies since 1978 as background to the development of the Bura Irrigation and Settlement Scheme. Secondly, I will discuss the physical environment of BFPP, the Tana River basin, and introduce the riparian and pastoral economies that exist in the area. Thirdly, I will examine the Bura Irrigation and Settlement Scheme (BISS) in the context of irrigation development in the Tana River basin. This will serve to establish historical and physical characteristics of the space in which the case study was carried out.

Kenyan national development strategies since 1978 will be outlined at three levels. Firstly, they are described at the national level (Table 3.1.). Secondly, particular emphasis will be given to one of these strategies, the policy of District Focus for Rural Development (DFRD)(Republic of Kenya, 1984b & 1987). This is done by analyzing the goals set for this policy and its implementation by using the Tana River District, and its District Development Plan (DDP) (Republic of Kenya, 1984a), as a case study. Thirdly, a general overview of the relationship between national development and international aid is presented, again with particular reference to Tana River District and the Bura Irrigation and Settlement Scheme.

Since independence Kenya's economic and political stability has done much to attract

Table 3.1. Kenyan National Development Strategies

| PHILOSOPHY | The concept of Nyayo/Nationbuilding embodied in Kenya African National Union (KANU) | | | |
|---|---|---|---|---|
| IMPLEMENTING AGENCIES | Regional Development Authorities (Dev. Committees) | Min. of Education | Min. of Health | Min. of Agriculture |
| POLICY TO BE IMPLEMENTED | District Focus for Rural Development (DFRD) | Education reform (structural change to a 8:4:4 system) | Health reform (establishing of Nyayo wards/focus on maternal and child care | National Food Strategy (aimed at diversification and intensification) |

Source: based on arap Moi, 1986

foreign investment and because of this Kenya has come to be regarded as a "success story" in Africa (Tostenssen, 1987). As a reflection of this Kenya became one of the first countries to obtain funds from the Extended Fund facility of International Monetary Fund in 1975, and to become eligible for World Bank structural adjustment loans in 1980 (van der Hoeven et al, 1986). Among development analysts independent Kenya was popular particularly in the late 1970's when over a decade's perspective had been gained from independence in 1963. These analyses reflect the impact on development of the first president, Jomo Kenyatta, and his administration. (Leys, 1975; Heyer et al, 1976; Hazlewood, 1979; Swainson, 1980; Kitching, 1980).

## 3.2. Development policy in Kenya since 1963

The development problems that Kenya inherited at independence in 1963 have defined the focus of development strategies ever since. In the main these problems

concerned the dualism of the internal economy (Mutiso, 1975; Slater et al, 1977; Ghai et al, 1979; Cowen, 1985; Kituyi, 1987). This dualism of the economy was acknowledged in policy making in two ways. Firstly, it was reflected in a desire to increase the African participation in the monetary economy as well as the africanization of ownership and control of private assets (Ghai et al, 1979). Particular emphasis was laid on the africanization of the high potential agricultural land in Central Kenya where, immediately prior to independence, the Economic Survey Mission of 1962 had concluded that three quarters of Kenyan exports were produced on the European farms (Smith, 1976).

Secondly, there was concern over the differential development between urban and rural areas and, within the rural sector, between high and low potential areas. This had been accentuated by continuing concentration of research and other developmental inputs in the high potential areas (op cit). Dualism of agriculture, such as a dichotomy between large scale commercial farms and small scale subsistence farms, is still today a predominant feature of Kenyan agriculture. The small scale farms occupy less than half of the arable land, generate annually 60-65% of agricultural income and employ 3/4 of the labour force (van der Hoeven et al, 1986). Kitching argues that the parameters for differentiationbetween Africans had been established before independence, and that the process has only been intensified since (Kitching, 1980, pg 315).

An increasingly problematic issue for development policy planning in Kenya has been the accomodation of a rapidly growing population into the economy. The rate of

population growth in Kenya, which is now estimated to be over 4% per annum (World Bank, 1988; Tostenssen et al,1987) contributes to these problems by increasing the pressure on available farming land. The land issue has always been central to planning in Kenya. Her reliance on a strong agricultural base is underlined by the lack of mineral wealth (Kitching, 1980). When the rate of population growth is combined with the fact that only 20% of Kenya's total land area is regarded as high or medium potential agricultural land (Table 3.2.), it is not suprising that landlessness poses one of the most serious problems for Kenyan development since independence.

External forces have been important in the development of the Kenyan economy and development policies. Strong reliance on only three export commodities (coffee, tea and petroleum products) (Table 3.3.), and the fact that Kenya exchanges c.1/3 of her GNP with the rest of the world, has made Kenya vulnerable to changes in the world market which effectively determine the terms of trade (Cowen, 1985; van der Hoeven, et al, 1986; Republic of Kenya, 1986c; Kituyi, 1987).

Other external circumstances which greatly affected Kenya especially during its second decade of independence were the rise in world oil prices in 1973 and 1979, declining terms of trade on the world market for primary products, loss of the Tanzanian (and partly Zambian) market as a result of the border closure in 1977, collapse of the East African Community and, the latest catastrophe, the drought of 1984. Also influental was the rising price of debt servicing as Kenya's debt service

Table 3.2. Proportions of Categories of Agricultural Land in Kenya and Tana River District

| Category | Tana River '000 ha | Tana River % | Kenya '000 ha | Kenya % |
|---|---|---|---|---|
| High Potential | 73 | 2.1 | 6785 | 13.0 |
| Medium Potential | 58 | 1.6 | 3157 | 6.1 |
| Low Potential | 3393 | 96.3 | 42105 | 80.9 |
| Total Agricultural Land | 3524 | 100.0 | 52047 | 100.0 |

Source: Republic of Kenya, 1986a

Table 3.3. Domestic Exports: Principal Commodities 1977-1985 (percent of total value)

| Commodity | 1977 | 1978 | 1979 | 1980 | 1981 | 1982 | 1983 | 1984 | 1985 |
|---|---|---|---|---|---|---|---|---|---|
| Coffee | 42.5 | 33.7 | 28.7 | 22.2 | 21.3 | 26.5 | 25.3 | 27.0 | 29.7 |
| Tea | 14.9 | 17.1 | 16.3 | 11.9 | 11.9 | 14.2 | 19.5 | 25.1 | 24.7 |
| Petroleum products | 15.1 | 16.3 | 17.7 | 31.1 | 30.7 | 26.0 | 19.5 | 17.4 | 14.0 |
| Sisal | 0.8 | 1.1 | 1.2 | 1.8 | 1.7 | 2.0 | 1.9 | 1.7 | 1.9 |
| Meat | 1.6 | 0.7 | 0.7 | 0.3 | 0.5 | 0.8 | 0.6 | 1.0 | 0.9 |
| Pyrethrum | 1.3 | 1.3 | 1.5 | 1.9 | 1.2 | 1.8 | 1.4 | 1.3 | 1.2 |
| Hides | 1.7 | 2.7 | 3.6 | 2.0 | 1.8 | 1.5 | 1.0 | 0.9 | 1.3 |
| Cement | 1.8 | 2.4 | 2.2 | 2.1 | 2.8 | 3.6 | 3.4 | 2.5 | 2.1 |
| Wattle bark | 0.4 | 0.4 | 0.5 | 0.4 | 0.5 | 0.6 | 0.5 | 0.5 | 0.5 |
| Sodium carbonate | 0.6 | 1.0 | 1.4 | 1.6 | 3.1 | 0.3 | 1.1 | 1.4 | 1.7 |
| Pineapples | 2.2 | 2.6 | 2.4 | 1.8 | 2.3 | 2.7 | 3.3 | 3.4 | 3.1 |
| COTTON | 0.1 | 0.4 | 0.2 | 0.5 | 0.3 | --- | 0.1 | --- | 0.3 |
| Other | 17.0 | 20.3 | 22.5 | 22.4 | 21.9 | 20.0 | 22.4 | 17.8 | 18.6 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Republic of Kenya, 1986a

rate (percentage of GNP) is exceeded in Africa only by Togo, Somalia, Madagascar and Nigeria (van der Hoeven et al, 1986). This gave the decade a sense of crisis management rather than development (Kituyi, 1985; Tostenssen et al, 1987).

The era since independence in 1963 is divided here into two periods. The first period covers the time of President Kenyatta's regime from 1963 until his death in 1978. I have called this period the Harambee Era, after his official philosophy of Harambee ("harambee" is Kiswahili for "self-help" or "pull together") adopted in the early quinquennial development plans. The second period covers the regime of President Daniel arap Moi from 1978 until the present. This period is called the Nyayo Era after Moi's philosophy of following in the footsteps of Harambee ("nyayo" is Kiswahili for "footsteps").

### 3.2.1. Harambee Era (1963-1978)

When the Harambee policy was officially launched by Prime Minister Jomo Kenyatta on 1st June 1963, it was not a new idea in Kenya (Odinga, 1967). The concept existed in several languages spoken in Kenya, but it was the declaration by Kenyatta in 1963 and the Government's Sessional Paper number 10 in 1965 that launched it as formal policy (Republic of Kenya, 1965; Kenyatta, 1968).

The Sessional Paper was written to define the policy of a Kenyan brand of African socialism and its application to planning of development. The Paper emphasizes the role of community development and self-help as part of the African tradition of "political democracy" and "mutual social responsibility" (Republic of Kenya, 1965;

Nyamu, 1980) from which African Socialism was seen to have developed. Self-help development was seen as the means of achieving self-reliance and as such it was central to the formal policy expressed in the paper. Development was understood as something which was implemented through planning. Mbithi et al have argued that the assumption on which the Sessional Paper was based was that no development takes place without planning and that all planning is controlable with planning (Mbithi et al, 1977). This is how it was expressed in the Sessional Paper:

"Self-help projects must be fitted into the plan and self-help efforts must be guided into useful channels. Self-help is an integral part of planned development and must be subject to the same discipline as other parts of developed effort. Planning in this respect is very much like exchange controls - one significant hole in the dike can reduce all other efforts to nought."
(Rep. of Kenya, 1965 , pg 36)

Despite the name, African Socialism, the policy set out in the Sessional Paper Number 1 of 1965, has been criticized for being neither African nor Socialist (Odinga, 1967). The paper acknowledged only a minor role for the public sector thus enforcing the trend of private accumulation of capital (op cit; Cowen, 1985). The policy provided for a strong role of the state in development investment and state protection of private property (Kituyi, 1987). In consequence an even stronger relationship was forged between state power and those in the forefront of capital accumulation, and as the concentration of accumulation focused on the office of president (through his allies) it also focused on his political stronghold in Central Kenya (Gertzel, 1970; Cowen,

1985). Some have argued that the Kenyatta regime was a reminder of an "ancien regime" "with a Versailles on the Equator at the President's home, Gatundu" (Hazlewood, 1979, pg 175).

Functionally Harambee was based on self-help groups which through small scale projects aimed at self-sufficiency in some areas of the economy. Often these projects were concerned with providing services such as health, education or water either directly through building infrastructure, or indirectly by working on a project with the aim of raising money to provide these services. The Harambee groups could be either long or short term depending on the project, and its needs. These groups were founded independently between neighbours, or within organizations such as the women's development organization, Maendeleo ya Wanawake (formed in 1950, which now has over 16 000 registered member women's groups), various churches, or under the Ministry of Social Services.

Although "Harambee" has been criticized for being merely a propaganda phrase, its economic and political importance should not be underestimated. This is so particularly in the rural areas as there was a perceivable shift in the text from the Second to the Third Development Plan on moving the locale of growth towards the rural areas (Mbithi et al, 1975). While it can be seen as the articulation of long-term policy aimed at satisfying popular expectations of the first government (Kituyi, 1987), it has been estimated that Harambee self-help contributed on average, over 30% of development investment during the latter half of 1960's (Mbithi et al, 1977).

3.2.2. Nyayo Era (1978 ->)

It could be questioned whether any real transformation has taken place in Kenyan national development policies to validate contrasting the periods 1963-77 and 1978 onwards along the lines suggested here. It could be argued that any apparent differences are basically due to the different characteristics of the presidencies (Cowen, 1985). But to contrast these two phases of Kenyan development does highlight that probably there has been more change, particularly in the relationship of political power and capital accumulation, than has been implied by the rhetoric. President arap Moi sees Nyayoism as a continuation of the Harambee policy:

"Nyayoism is the evolution of the KANU(Kenyan African National Union) principles and spirit, which recapitulate and cultivate the traditions and heritage of the motherland in new times and circumstances."
(arap Moi, 1986, pg 16)

Cowen argues that a basic difference in the economic policies of the two presidents was that while Kenyatta stood for combination of political and economic power, Moi has attempted to alienate upholders of state power from the accumulators of capital (Cowen, 1985). This has been enforced by, for example, shifting political power away from Central Kenya in general, and the Kikuyu (President Kenyatta's people) in particular. This can also be interpreted as Moi's faithfulness to the principle of "regionalism" supported by his old party KADU(Kenyan African Democratic Union) until its voluntary disbandment in 1964.(Leys, 1975)

In President Moi's own evaluation the two most significant changes have been the redesigning of the education system, the so called 8-4-4 system, and the District Focus for Rural Development (DFRD) strategy (see Table 3.1.). This latter is important background to this thesis and is discussed in more detail below in 3.3.

Apart from clear policy decisions that have affected the country's planning administration there are also other differences and trends. Whereas the Harambee era can be seen to have originated from traditional cultural organizations (Republic of Kenya, 1965; Mbithi et al, 1977), the Nyayo phase has seen a more centrally controlled expression of mutual responsibilities. For example, it is desired that all self-help groups are affiliated with relevant ministries.

Significant has also been the increasing role of the party KANU (Kenyan African National Union) in development planning. And as the head of the party, that of the president. Kenya was declared a one party state in 1969. In December 1986 constitutional amendments were made to the effect of removing the security of tenure of the office of Attorney-General which in effect gave the president powers to make constitutional changes. (Tostenssen et al, 1987).

If the leading thought behind Harambee was self-help and self-reliance, the red thread of Nyayo is "nation-building". Nation-building is development personified, and it is the duty of every Kenyan to contribute to this process.

"To reiterate, there are three important factors in the Kenyan style of nation-building:

the vehicle, the force and the philosophy. KANUis the vehicle, Nyayo is the moving spirit or force, and Nyayoism is the philosophy."
(arap Moi, 1986, pg 18)

Arap Moi divides the development strategies of Nyayo in to two; the "subtle" and the "visible". The former include, perhaps rather optimistically, such activities as meet-th-e-people tours, war against contraband trade, dynamic revitalisation of the ruling party and crusade for moral probity. The latter includes the changes such as the 8-4-4 education programme and the DFRD strategy, as well as the forming of several commissions and secretariat established "for management, conservation and development" (arap Moi, 1986).

Arap Moi came into power in the aftermath of the coffee boom of 1976 and 1977, during which new development programmes were launched. As the new government was trying to establish itself littleattention was paid to prudent monetary policies. For example, in 1979 by presidential decree all departments of the civil service were to increase their labour force by 10%. As the coffee boom collapsed, oil prices rose and the world experienced a recession in 1981, the focus of the Fourth Development Plan (1979-1983) "Poverty alleviation"was shifted to "Mobilizingdomestic resources for equitable development" in the 5th plan (1984-1988) (Republic of Kenya, 1979,1983b; Kituyi, 1985).

When the Sessional Paper Number 1 of 1986 was published it was the first official volte-face of the policies expressed in SPN 10/1965 (Kituyi, 1985). As the Paper

reviews the 1984-88 Development Plan, it expresses concern for the accomodation of the rapidly growing labour force and training of the civil service. There is a shift in the plan from equitable development on social basis to equitability on regional basis, and a framework for more donor support as part of development expenditure is provided (Republic of Kenya, 1986c; van der Hoeven et al, 1986).

The District Focus for Rural Development policy is not usually seen as a framework within which development aid efforts could be based but I have selected the DFRD-policy for special attention in this chapter because in my opinion it reflects the kind of existing political and economic structure that could have been more focused on in the planning of BFPP.

### 3.3. District Focus for Rural Development

Districts were intended to be the main unit of official rural development planning from 1965 when the District Development Committees (DDCs) were formed and District Development Officers (DDOs) were first appointed. This system was met with criticism due to its inefficiency caused by the circumstances in which planning was decentralized to the districts, while finances were controlled centrally from relevant ministry headquarters in Nairobi. In effect, the DDCs remained as extension agencies of the ministries and a situation of alienation between the population and the DDCs developed due to no transfer of control of resources to local levels (Makokha, 1985). It has been argued that the policy led to an excessive growth of administration at the provincial level (Mackenzie et al, 1987).

The policy of "District Focus for Rural Development" (DFRD)was launched in July 1983. In theory this meant shifting the responsibility for implementing as well as planning of rural development from ministry and provincial headquarters to the districts (Republic of Kenya, 1984b). In practice, it has been argued, the following have remained as problems: limited local, non-elite participation in the District Development Committee, lack of mechanisms to integrate local organizational forms with DDCs, lack of mandate to foster local organizations and the fact that most of budgetary control remains outside districts. (Mackenzie et al, 1987).

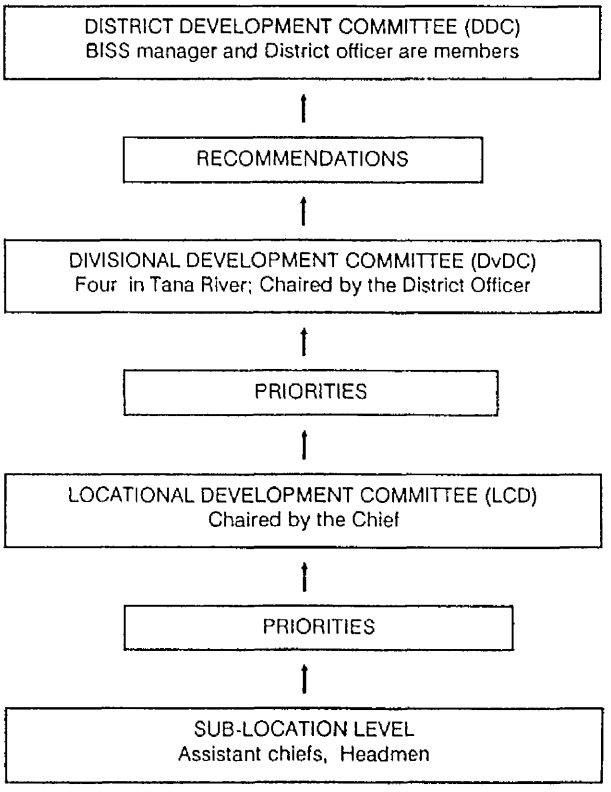
The objective of the DFRDwas to involve the participation of local communities in the planning procedure for rural development projects within the district. Through participation of district population itwas envisaged that theirspecific knowledge would contribute towards improving problem identification, resource mobilization, and project implementation (Republic of Kenya, 1984b).

"Ifthe essence of the development problematic concerns relations of power, as many have argued (Oakley and Marsden, 1984), the organization for empowerment is a conditio sine qua non for its realization." (Mackenzie et al, 1987, pg 301)

The District Development Committee (DDC)(Figure 3.1.) established in each district is concerned with district specific projects[1] located in the district of its jurisdiction;

[1] District specific projects are projects entirely within the jurisdiction of one administrative district

Figure 3.1. Development Committees




Source: Vainio-Mattila,1987

these include projects sponsored by the Government or local authorities, Harambee efforts and those sponsored by foreign donors. Its duties include co-ordinating the planning and implementation of these projects, as well as continually identifying district specific priority projects (Republic of Kenya, 1984b & 1987).

The identification of these projects starts at the sub-locations and in the Local Development Committees (LDC), where the priorities for projects are defined and then submitted to the Divisional Development Committee (DvDC), which makes the

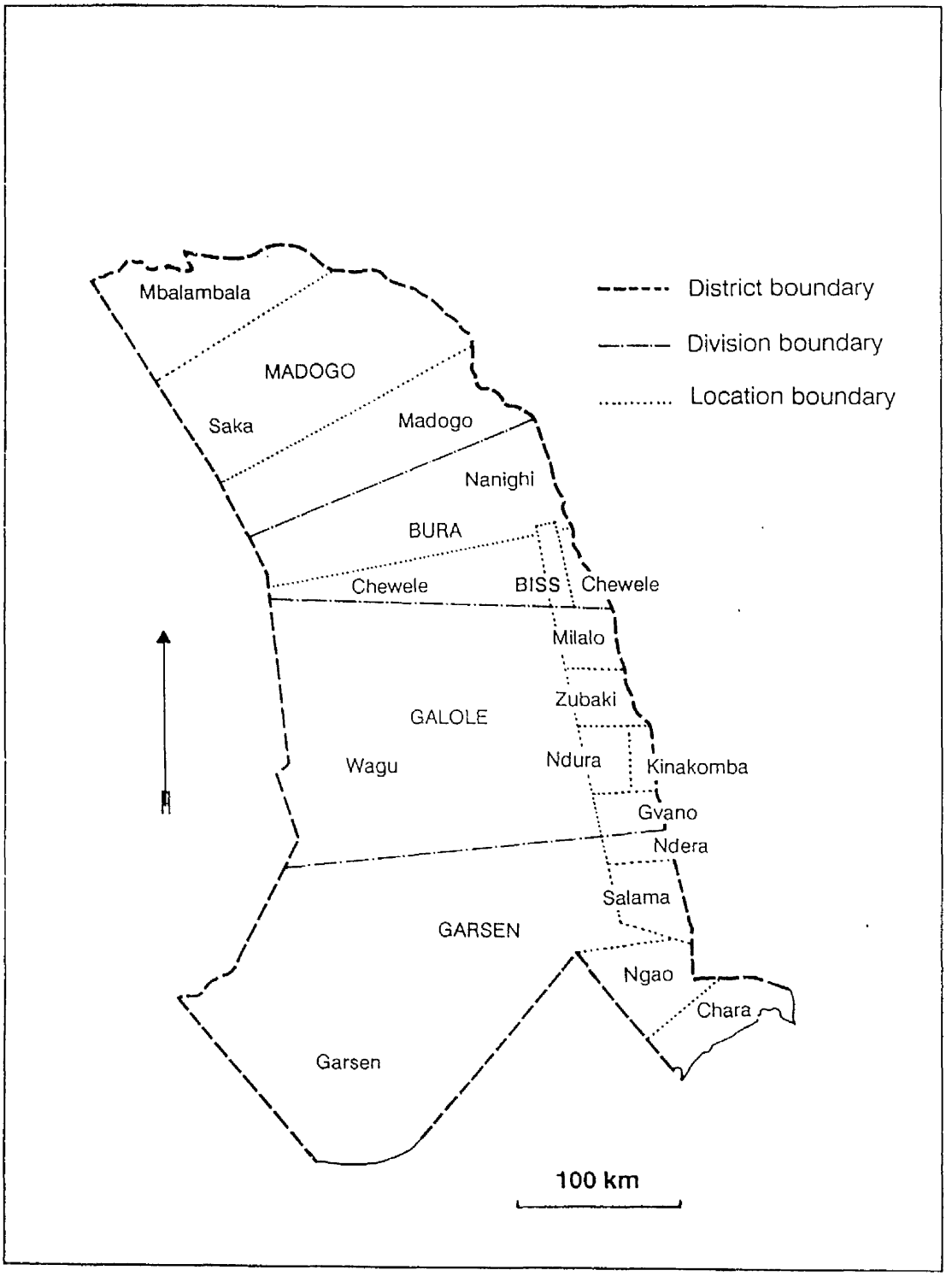
recommendations for the DDC. Represented on the DvDC are the different ongoing projects, and existing Non-Governmental Organizations in the area, as well as the administration (Figure 3.1.).

Tana River District is divided into four divisions (Garsen, Galole, Madogo, Bura), and these in turn into 17 locations (Figure 3.2.). The Bura Irrigation and Settlement Scheme (BISS) is one of the three locations of Bura Division. The other two are Nanighi and Chewele. All these locations have functional Locational Development Committees (LDCs) with representatives from women's groups, farmers co-operatives and other structured interest groups in the area. The whole district is under the jurisdiction of the Tana River County Council.

In Tana River District the aims of the district specific projects defined in the plans for 1973-83 and 1984-1988 have focused on intensification of agricultural demonstration and research trials, diversification of crops and increase of hectarage under production, mainly by establishment of small irrigation schemes. There are specific plans for a construction of a Farmers Training College (FTC) and for the completion of Phase I of the Bura Scheme (Republic of Kenya, 1984a).

The implementation of these projects has not always been straight forward. In 1982 implementation was hampered by floods washing away planted crops, wildlife destroying crops in the field, shortage of water on the irrigation schemes, impassable roads during rains, and thus difficulties in agricultural input delivery, lack of credit facilities, difficulties in market creation for surplus, inadequate land preparation on the

Figure 3.2. Tana River District Administrative Divisions



major irrigation schemes (BISS in Bura and Hola in Galole division Figure 3.2.) as well as lack of transport facilities (op cit).

The DFRDpolicy has allowed DDCs to plan at a more specific level through allocation of finances, because with DFRDthe DDCs have a mandate to decide over the use of money in the District (Makokha, 1985). This is reflected in the 1984-1988 DDP for Tana River (Republic of Kenya, 1984a) in that the broad aims of increase in production and improvement of facilities are now accompanied by a number of small scale projects at the locational level. Such projects are construction of schools, provision of cattle dips and slaughter houses within the district for example.

In the case of Bura, the Scheme is represented on the DDC by the Project Manager of BISS and the District Officer. The tenants are not at present involved in this structure directly as they are expected to be catered for by the Scheme in their development needs, whereas the rest of the population can be involved through their representatives on the committees.

The DFRDhas been criticized for being just another form of centralisation in "guise" (Mackenzie et al, 1987). However, I feel that the District Focus framework is a Kenyan national effort for directing development towards being more community centred. In theory, at least, it provides an opportunity for the community to have an impact on the development of their habitat. At the local level the LDCs could provide, or be utilized as, fora for dialogue taking place between planners and representatives of the local community when interventions are still at the pipeline stage. As such it is

the kind of local organization with which development aid projects should be integrated for mutual benefit.

3.4. Development aid in Kenya

In the first decade of independence Kenyan agriculture was growing at the annual rate of 5 %. This was mainly due to the removal of remaining production restrictions on African farmers, transfer of significant high potential land from extensive European settler ownership to smallholder farming, expansion of high value production and the introduction of high yielding cereals. The strong agricultural sector helped to create an economy where a growth rate of 6.5 % was sustained together with a level of investment above 20 % of GNP. These created circumstances easily able to attract international aid and other investment for development (Tostenssen et al, 1987). Leys argues that foreign capital was also regarded as preferable to the indigenous Asian capital as an agent of growth (Leys, 1975, page 119).

The main sources of international aid to Kenya have been Sweden, Norway, Denmark, West Germany and the United Kingdom. In 1985/86 these countries were responsible for 26 % of all grants received by Kenya. During the same year Canada, Denmark, Sweden and UK were the source for 24 % of loans raised by Kenya (Republic of Kenya, 1986a). United Kingdom has had a particular role in that much of its aid has been channelled towards paying compensation to the European settlers whose land the Kenyan Government bought after independence. (Holtham et al, 1976).

When the Kenyan economy met with difficulties in the 70s, it could be argued that the aid policy of donors did not reflect the consequent changes in Kenya's own ability to meet the development costs of the many development programmes. The focus of funding, both by the government and the donors, had been on capital and technical assistance costs of development projects, rather than on recurrent expenditure (estimated to be 10-15% of total project cost), maintenance costs, distribution of services, staff development requirements or foreign exchange constraints (Tostenssen et al, 1987).

I would agree that donors should acknowledge their role in, and responsibility for, the evolution of economic trends in Kenya. The share of external aid in total government development expenditure rose from 39% in 1979-80 to 84% in 1982-83 (Mosley, 1986). In the rural sector this is particularly visible as there are very few development projects with no donor involvement.

The first half of the 1970s saw an increasing dependence on the World Bank and the International Monetary Fund (IMF), as well as on bilateral aid. As needs for donor assistance were defined the government was under pressure to demonstrate equity in the face of economic gains at the centre of political power. Aid programmes were identified in the areas of immediate contribution into the economy; such as rural access roads, agriculture and water supplies.

Any negative trends in the agricultural sector could easily be attributed to the diverse aims, interests and management approaches of the donors. It would seem that

agricultural development takes place despite donor competition forcing individual projects to become the basic unit of development administration and aid management, and increasing binding of aid to products of the donors (Tostenssen et al, 1987).

There is some disagreement as to the reasons for decline in Kenyan agriculture. The World Bank attributes it to failures on the part of the government, in particular to weak institutions that enforce poor performance through a problematic implementation process. As a result of this IBRDstructural programmes have concentrated on, for example, the supervision of agricultural schemes, export promotion schemes, agricultural pricing and marketing, and land and population policies (Burrows, 1976; Mosley, 1986; Tostenssen et al, 1987). Mosley (1986) has argued that decline in the agricultural sector has historical reasons that are peculiar to Kenya rather than to Africa and should in today's Kenya be interpreted as a problem in the overseas aid transfer rather than administrative failures by the recipient.

BISS is an example of a scheme promoting agricultural production for export. The Scheme started as a part of the IBRDprogramme of agricultural schemes in Kenya. From the beginning it has been an amalgamated effort of several donors, whose involvement has varied during the decade. Close to 80% of the financing was to be provided by international donors (Table 3.4.).

By 1983 the InterministerialCommittee, set up to evaluate the financial state of BISS, was looking for ways in which to meet the expected annual deficit of over US $ 2

Table 3.4. Proportional Financing of BISS as estimated by the World Bank in 1977

| Source | % (of total US $ 98.4 million) |
|---|---|
| World Bank/IDA | 40.7 |
| European Development Fund (EDF) | 12.3 |
| Netherlands | 8.9 |
| United Kingdom (ODM) | 8.6 |
| Commonwealth Development Corporation (CDC) | 8.6 |
| Government of Kenya | 20.9 |
| total | 100.0 |

Source: World Bank, 1977

million (Republic of Kenya, 1983a). By this time it was already recognized, as was later documented (World Bank, 1984), that unfeasibility of BISS in economic terms was largely due to miscalculations at the planning stages in land capability, human power development requirements, choices in basic technological infrastructure and so on. However, in 1986 World Bank made the decision to withdraw from further involvement in BISS pointing to managerial and administrative inadequancies within the Scheme structure, rather than to inadequate evaluation and planning procedures accepted by the Bank in 1977.

It was accepted that BISS had failed to achieve aims set for it, but the policy of "accelerated development" (see Chapter 1.2) was not acknowledged to be at fault. The failure of BISS in economic terms can be seen as an example of a failure of the modernization approach to development.

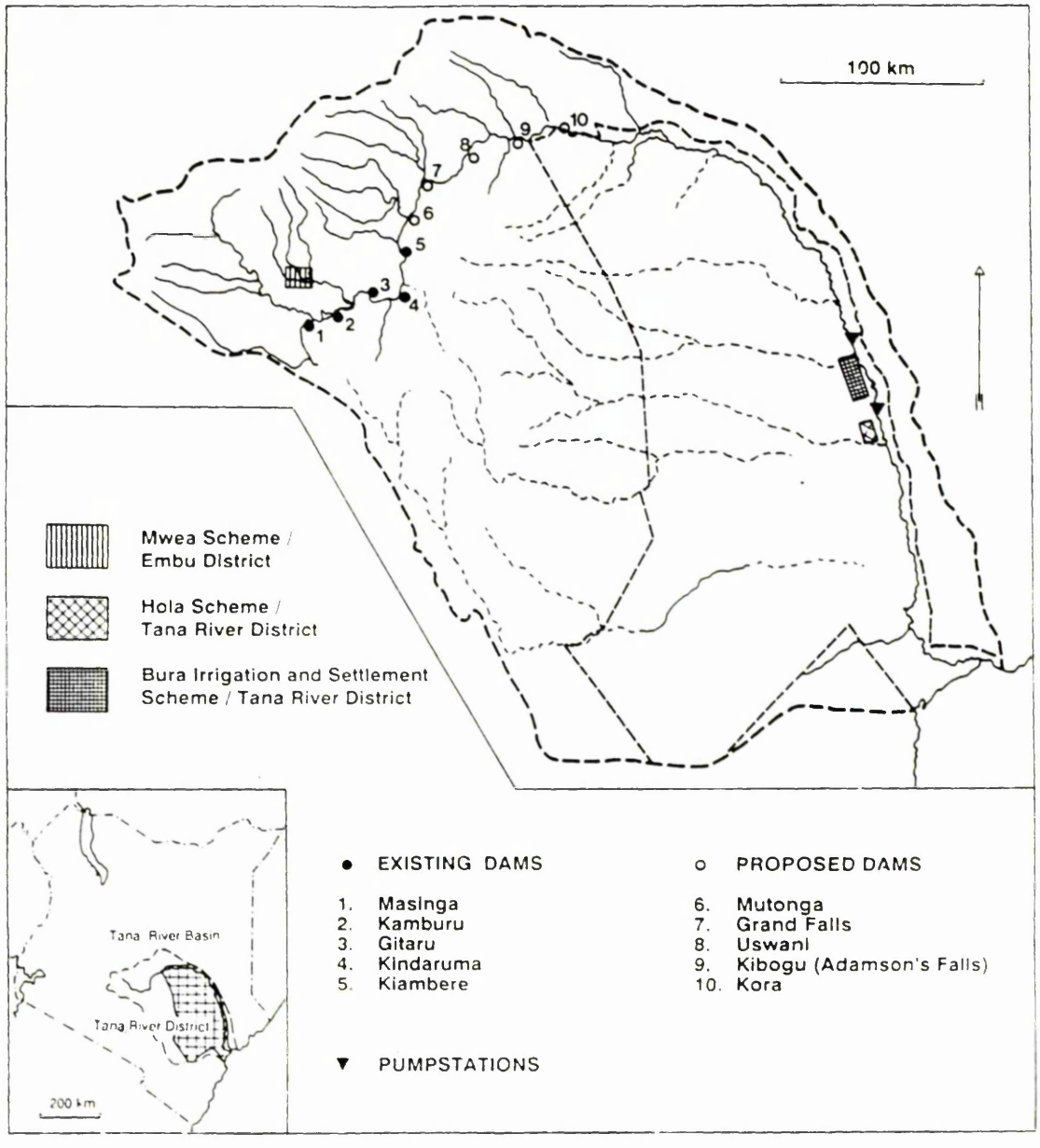
Below I want to give a view of the physical surroundings of the Scheme as well as of the social organization that existed already before the Scheme was initiated. They contribute to the special character of the Scheme and to the analysis in the following chapters.

## 3.5. The Tana River Basin

Tana River is one of the two perennial rivers in Kenya that flow into the Indian Ocean. The Tana River collects its water from numerous tributaries from Mt Kenya and then meanders along a tortuous route to the north-east and then south to the Indian Ocean (Figure 3.3.). The name of the river, Tana, is derived from the Galla word for red. The Tana River basin is perceived as an important resource for agricultural development in Kenya by planners (Saha, 1982; World Bank, 1977 & 1984). Its land area (95131 km2) covers 17% of Kenya's total land area, and the river Tana that flows through the basin for 1012 km represents 40% of Kenya's total identified irrigation potential (Republic of Kenya, 1977; World Bank, 1984). As the National Food Strategy (Table 3.1.) has focused on self-sufficiency in food, development of irrigated agriculture in the basin has been a response to demands for diversification and intensification of agriculture in order to reduce the high level of imports (Saha, 1982; arap Moi, 1986).

The water resources of the River Tana have been developed for two purposes. Firstly, irrigation development exists all along the river. The Mwea Irrigation Scheme in Embu District (5 800 ha), and BISS (2 500ha) and Hola (850 ha) schemes in the middle

Figure 3.3. The Tana River Basin

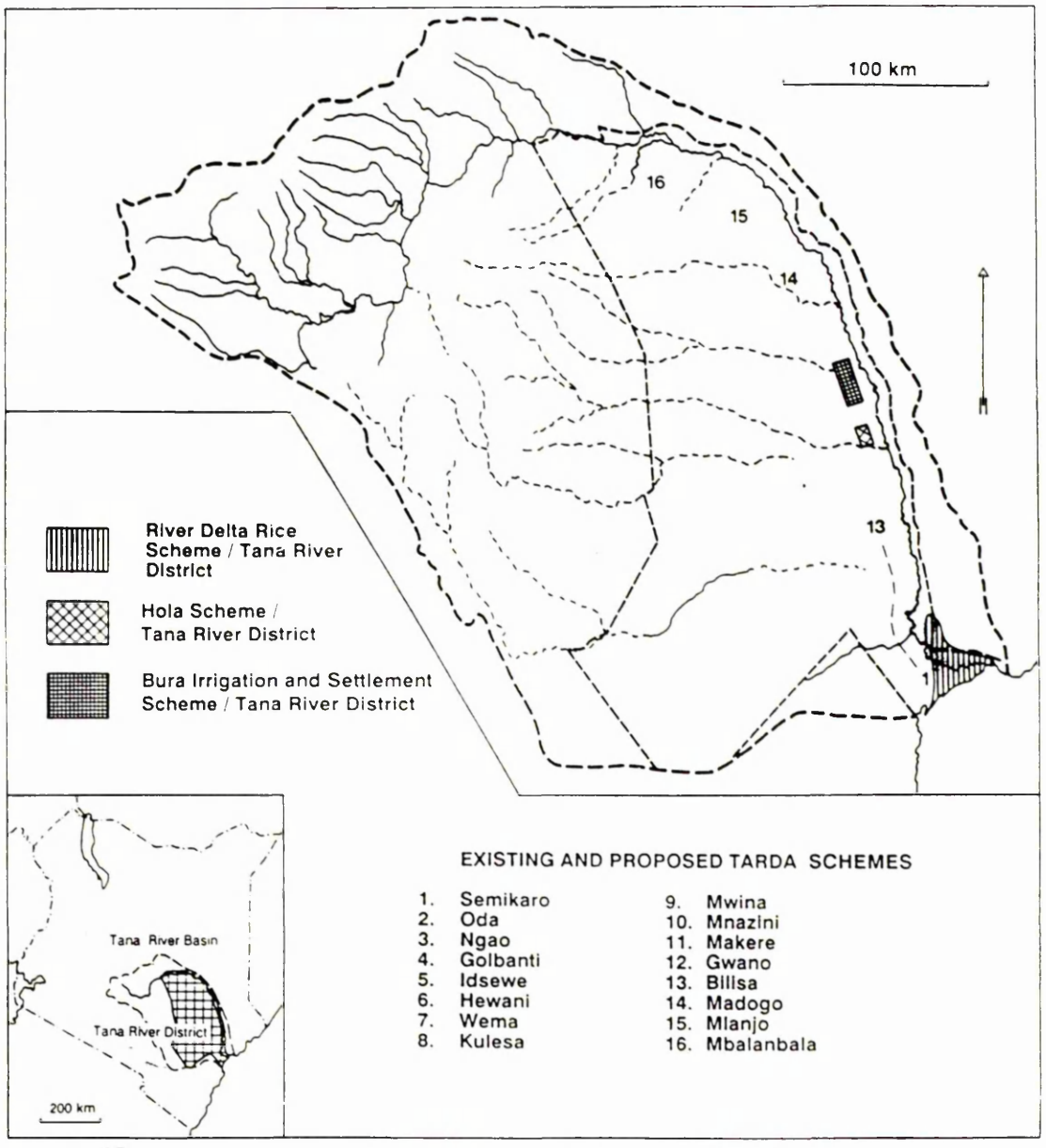


Tana represent large scale irrigation (by Kenyan standards), whereas there are several small scale schemes in the delta area (Figure 3.4.) (Republic of Kenya, 1986a). Secondly, hydropower development upriver is playing an increasing role in forcing the development of irrigation in the traditionallyflood dependent areas, as the dams regulate the flow in the river thus reducing flooding (Adams et al, 1986).

The irrigation development falls under three authorities. The Tana and Athi River Development Authority (TARDA), which was founded in 1974, manages the Tana River Basin as a whole with the exception of the Mwea and Hola Schemes. These two are managed by the National Irrigation Board (NIB). The Bura Scheme was started under the NIB but presently is a semi-autonomous body within the Ministry of Agriculture and Livestock Development (MoALD)(Figure 3.4.).

At the time of conception of the Bura scheme the flow of the river was still relatively unregulated. To the two hydro-electric power stations then operating (Kindaruma commissioned in 1967 and Kamburu in 1974) an additional three have been built (Gitaru in 1978, Masinga in 1981 and Kiambere in 1987) and a further five have been planned, but no construction has yet been started (Mutonga, Grand Falls, Kora, Uswani and Kibogu). Significantly all the hydropower development has taken place upstream from Bura (Figure 3.3.). (Hughes, 1987; Vainio-Mattila,1987)

Figure 3.4. Administration of Irrigation Schemes in Tana River District

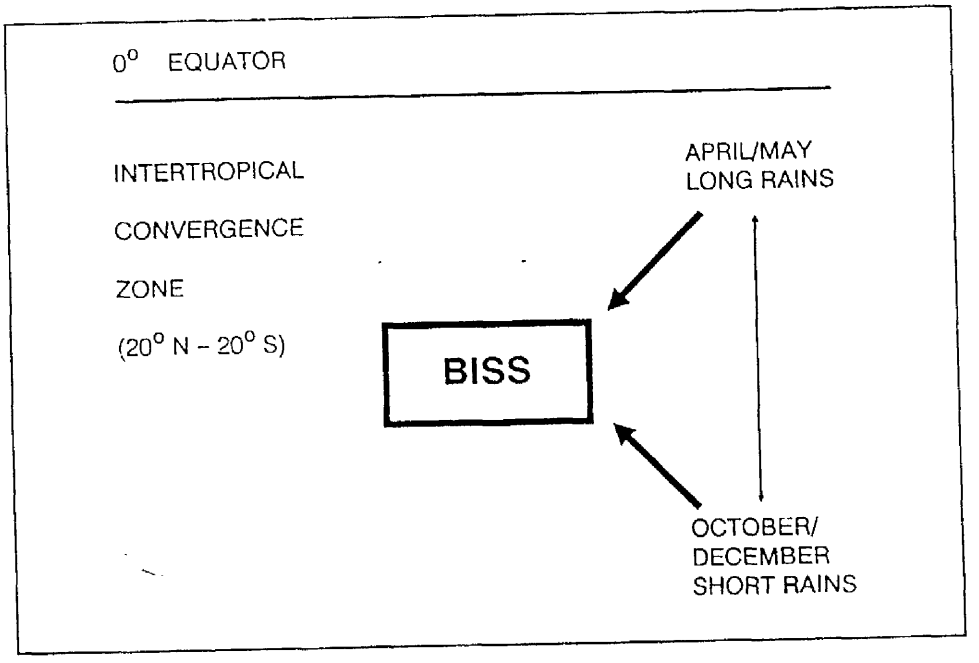


3.5.1. Physical environment

The Bura Irrigation and Settlement Scheme (BISS) is situated in the Tana River District, the headquarters of which are in Hola some 50 km south of Bura, on the west bank of the Tana River. (see Figure 3.3. for the location and Figure 3.11. for the geography of the Scheme).

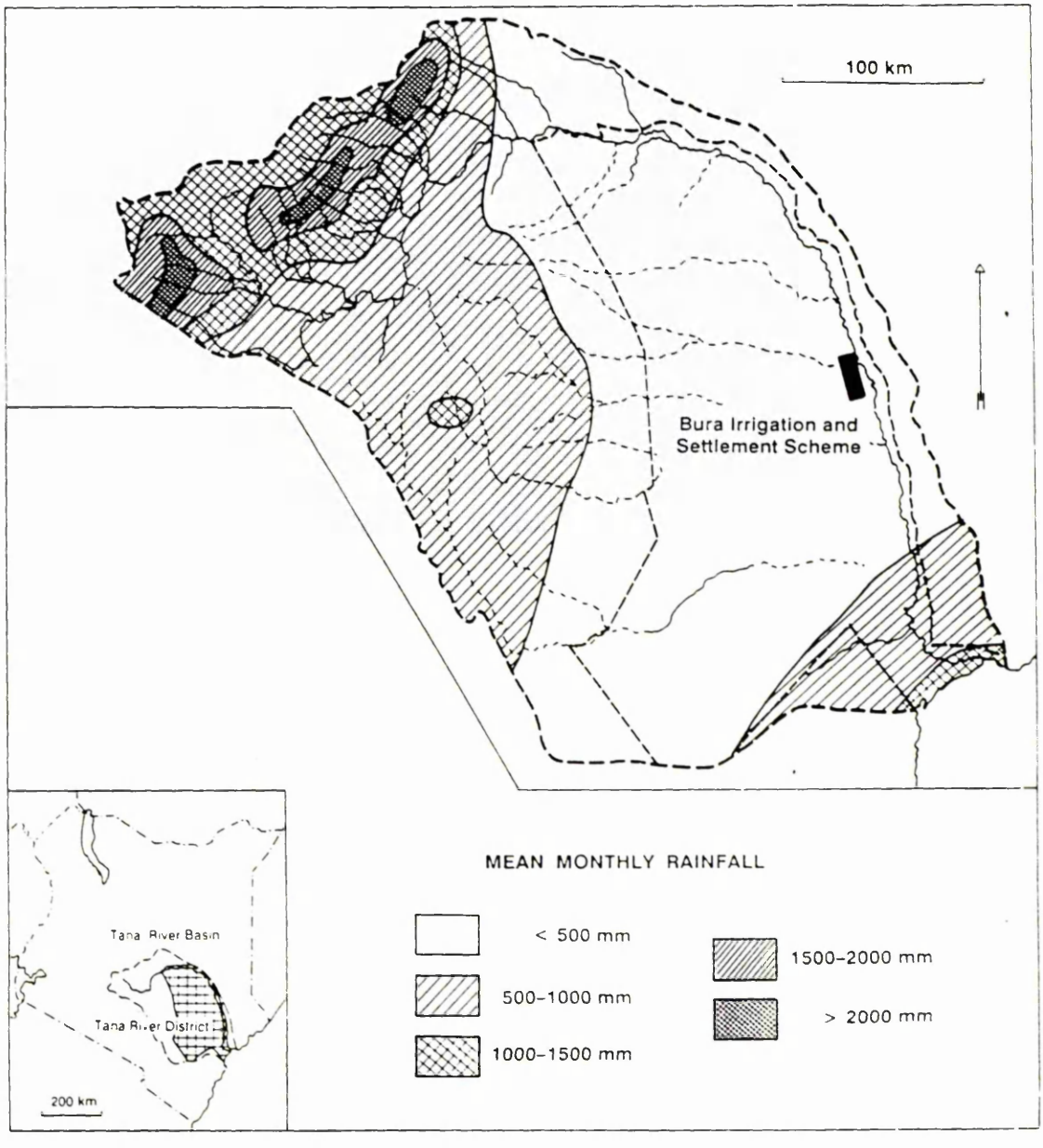
Ecologically the area can be divided into two; savanna and riverine forest. The BISS itself is situated in the dry savanna scrub vegetation zone which is drought dormant

Figure 3.5. Wind-rain Relationship in Bura




Source: Vainio-Mattilafor this thesis

Figure 3.6. The River System and Rainfallin the Tana Basin



for most of the year. This type of semi-arid environment can be regarded as vulnerable in the sense that the ecosystem can be easily disrupted and regeneration restricted by human intervention. This has happened in Bura as a result of bush clearing prior to Scheme construction. Already the effect of irrigation development in the area has meant a virtual destruction of the savanna vegetation. Walking around the Bura Scheme today it is possible to see the land and sky meet as a straight line in the horizon, whereas in 1934 the vegetation was described thus:

"The flood valley of the river is for the most part covered with dense grass and forest while the dry lands on either side, although the vegetation is sparser, are sufficiently well clad in acacia, balsam and other desert trees to reduce the range of vision to a few yards."
(Harris et al, 1934, pg 5)

The riverine forest constitutes the second ecological zone, and provides, for example, timber and grazing resources. In this forest the average standing volume is 50-100 m3/ha, of which 10-15% is in the form of deadwood or damaged stems (FINNIDA, 1984; Johansson, 1985). The average standing volume of the bushland surrounding the scheme is estimated to be 5 m3/ha, and of this only 2 m3/ha is of value as fuelwood. This is significant because the estimated annual need for firewood by the Scheme and its immediate surroundings is estimated to be 20 000 m3 (Johansson et al, 1990)

As Bura is situated so close to the Equator, it is subject to the air movements in the

intertropical convergence zone and the migration of the north-east and south-east trade winds, In April/May the northward migration of the north-east winds give localized heavy rainfall and the "long rains" take place. Later in the year, around October to December the "short rains" occur as the south-east winds are replaced by winds from the north-east (Figure 3.5. &3.6.) (FAO/UNDP,1968; Republic of Kenya, 1977). In the area where BISS is located an average annual rainfall of 400 mm is expected but, as the chart for rainfall for 1987 illustrates (Figure 3.7.), it is very erratic, and the average has littlerelevance.

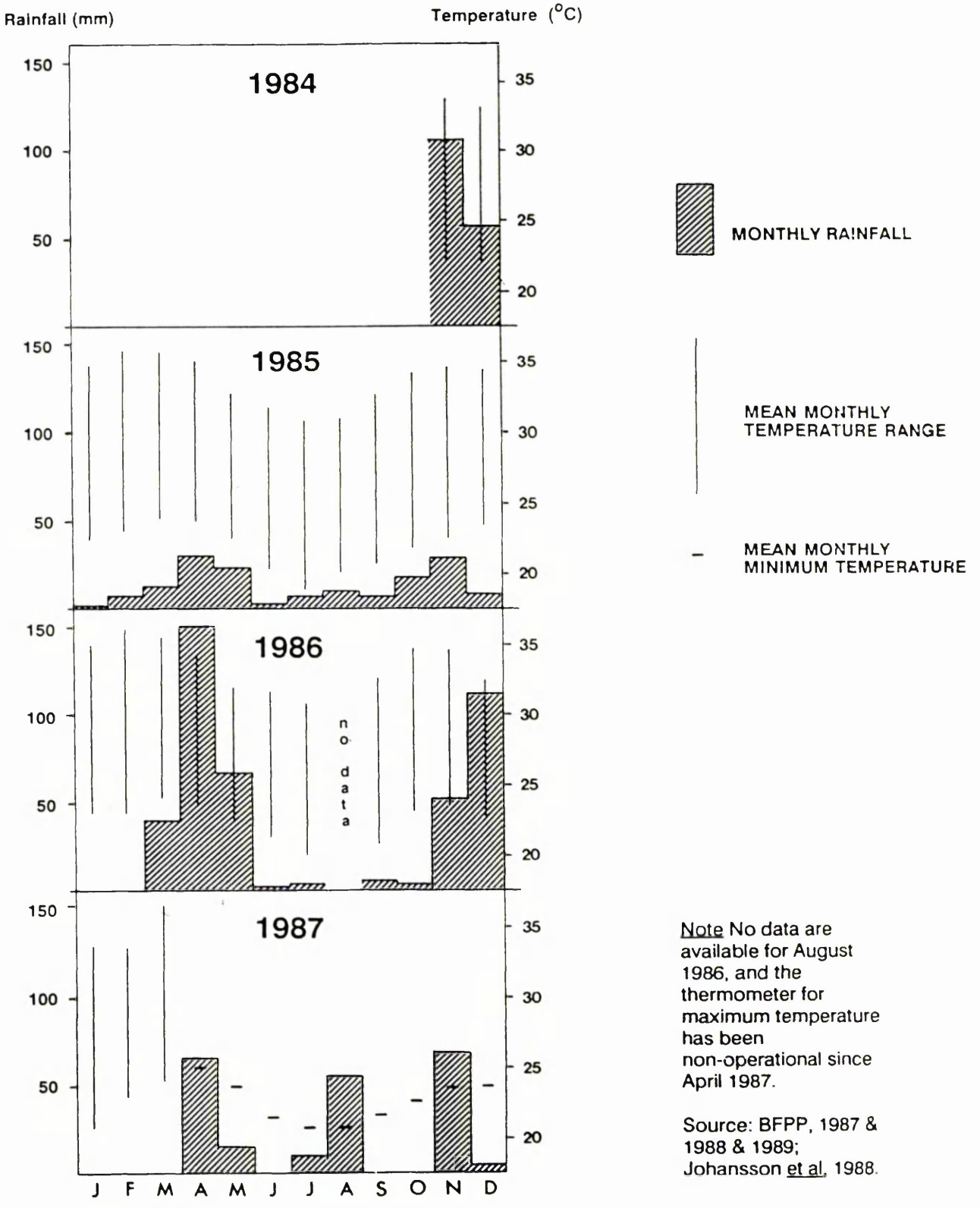
The annual range of average temperature is small, 26 °C during July to August to 29 °C in February to March; the mean maximum temperature being 35 °C in February and the minimum 20 °C in August. Variations in relative humidity are also small, being within the range of 40 to 80 per cent throughout the year depending on the time of day (Republic of Kenya, 1977). For an example of relative humidity and temperatures in Bura, see Table 3.5. and Figure 3.7.

Table 3.5. Mean Relative Humidity at 0900 and 1500 hours, Bura, 1987

| 1987 | Mean Relative Humidity (%) 0900 | 1500 |
|---|---|---|
| January | 72.2 | 40.2 |
| February | 70.0 | 39.0 |
| March | 69.2 | 44.3 |
| April | 74.0 | 54.0 |
| May | 73.0 | 53.0 |
| June | 70.1 | 51.6 |
| July | 79.4 | 50.2 |
| August | 77.8 | 53.4 |
| September | 69.1 | 42.1 |
| October | 67.0 | 41.4 |
| November | not available | |
| December | 74.2 | 46.2 |

Source: BFPP, 1987

Figure 3.7. Average Monthly Rainfall and Mean Monthly Temperature (1984 to 1987) in Bura




Note No data are available for August 1986, and the thermometer for maximum temperature has been non-operational since April 1987.

Source: BFPP, 1987 & 1988 & 1989; Johansson et al, 1988.

Agricultural potential

The rainfall of the area (Figures 3.6. & 3.7.) is neither adequate nor reliable enough to support rainfed agriculture. Until the growth of the upriver development the river flooded regularly twice a year, and once in five to ten years major floods occurred causing a shift of habitation from one bank to the other. The last major flood occurred in 1962 damaging agricultural production on the east bank, causing a shift to west bank. In the last five years the west bank settlement has been strengthened through links with the irrigation scheme. The shifting settlements have not been documented except for early maps placing village centers on alternative sides of the river. The last exceptional flood, 1962, is still well remembered by elder villagers who describe its impact to have been so great that "the two sides of the river exchanged places".

The Ministry of Water Development has classified agricultural land potential in Kenya

Table 3.6. Definition of Agricultural Potential of Land

| rainfall (mm/a) | agricultural potential |
|---|---|
| over 890 | high |
| 635-890 | medium |
| under 635 | low |

Source: Saha, 1982

Figure 3.8. Agricultural Potential in the Tana River Basin

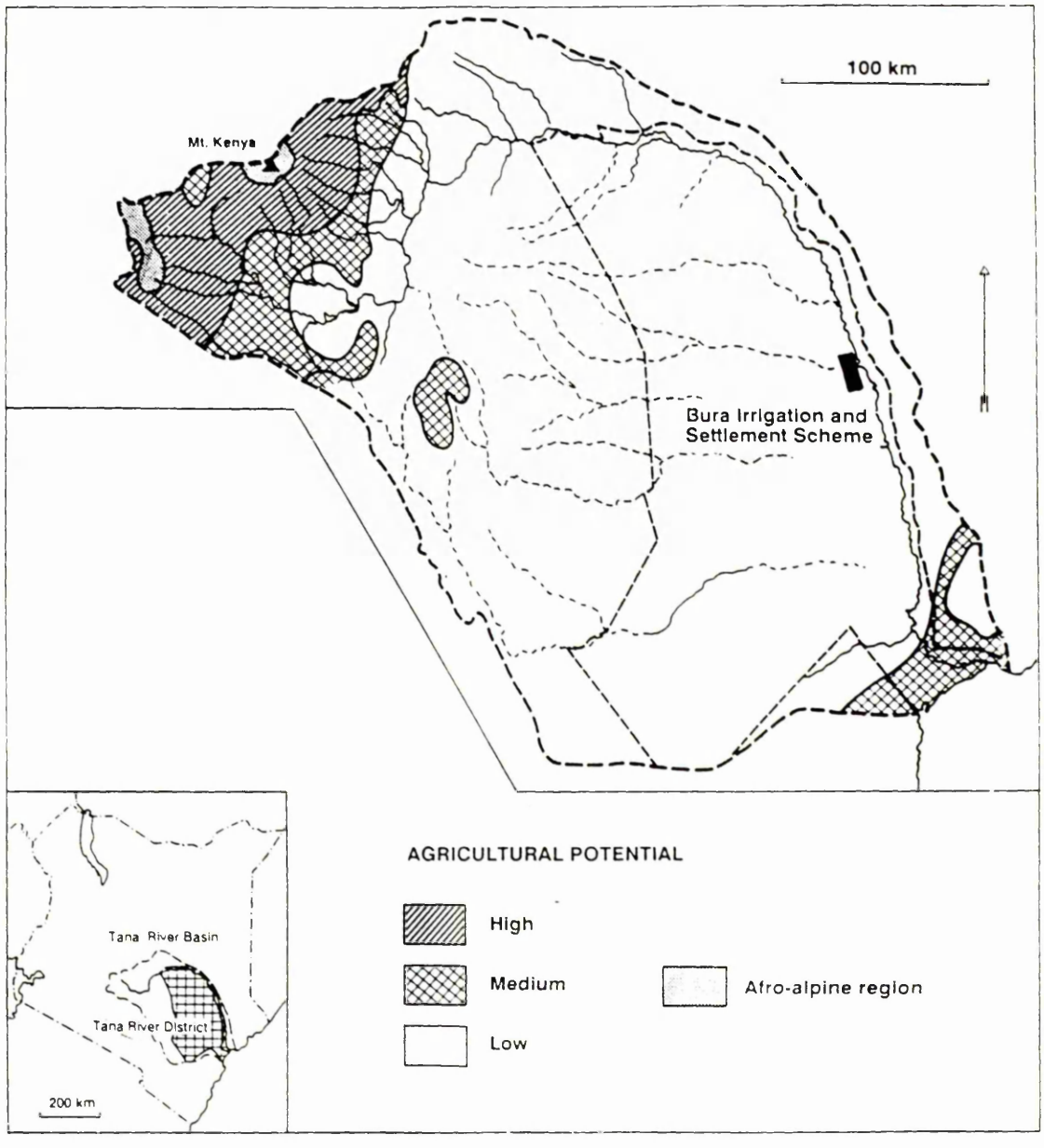


Table 3.7. Area of Land Required per Person for Achieving an Acceptable alevel of Subsistence

| potential | ha/person required |
|---|---|
| high | 0.31 |
| middle I (Kirinyaga, Meru, Embu) | 0.91 |
| middle II (Machakos,Tana, Kitui) | 1.82 |
| low (rangeland) | 91 |

Source: Republic of Kenya, 1976

based on a four category land potential zoning system. According to this of the 75% of the Tana River Basin area which is used for small holder agriculture, only 8.3% is high potential. This area supports 70.2% of the total population of the Tana River basin (Saha, 1982). Of the total area of Tana River District only 2.1% is regarded as high potential (Republic of Kenya, 1986a) (See Table 3.2.). Also according to this classification BISS in the 1953 Swynnerton Plan, when land was categorized according to rainfall, lies in an area of low agricultural potential (Table 3.6. and Figure 3.8.).

In 1976 TRDAcalculated the minimum area of agricultural land that was required in the differentzones of potential in order to maintain an acceptable level of subsistence for the population (Table 3.7.). Without irrigation the BISS area would undoubtedly be in category low (Saha, 1982). Based on this, the Tana River Basin could support

a population of 3.55 millionpeople, and as in 1979 the population of the area was 3.19 millionthe basin should be able to support its population. The population density of the BISS area before its establishment was 1 person/km (Alilaet al, 1979).

### 3.5.2. Socio-cultural background to BISS

Prior to the development of BISS the west bank of the middle Tana River was regarded as "virtuallyuninhabited" (FAO, 1967). As the area had been mainly used by the nomadic population for grazing, ACRES/ILACOestimated that the net production of the area, before development, was KShs 4/=/ha/a (Gitonga, 1985). However, there were two thriving economies practised in the area. The riparian economy of the Malakote and Pokomo existed on both banks of the river (Figure 3.9.). For the Galla (Orma, Borana, Korokoro) and Somali, who were practising semi-nomadic pastoralism on the hinterland, a north-south migration route traversed the BISS area. As an indication of the ethnicity of groups in the Tana River District I have included Table 3.8., which is based on the 1969 Census.

The lives of these peoples have been littlestudied, most historical information deriving from missionaries based in Ngao, Lower Tana since 1887, and colonial records. As the Settlement Schemes have been established it has been the immigrants whose lives have been focused on, not the autochthonous inhabitants of the area. The following paragraphs outline the riparian and pastoral economies.

Figure 3.9. Kenyan Nationalities

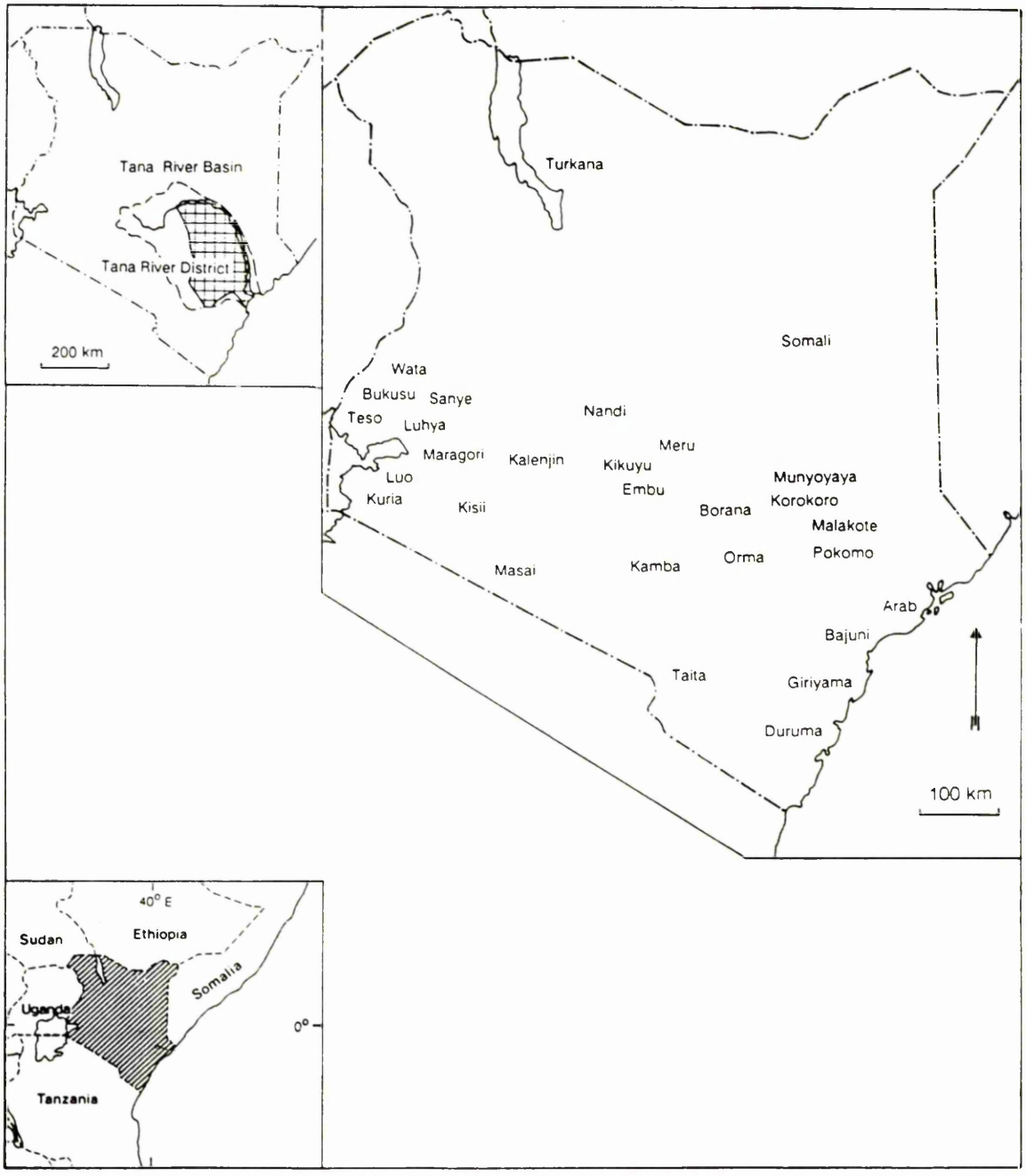


Table 3.8. Population of Tana River District

| | |
|---|---|
| Pokomo incl. Malakote | 57% |
| Orma | 31% |
| Mijikenda )<br>Boni )<br>Korokoro ) | 12% |

Source: Elmendorf, 1976

Riparian economy

The Malakote and Pokomo are both Bantu speaking peoples of Nyika origin. They are often referred to as the Upper Pokomo (Watu wa Djana) and Lower Pokomo (Malachini). Both groups are patrilocal, patrilineal and exogamous but the Upper Pokomo, who usually identify themselves as Malakote, are Muslim and the Lower Pokomo, or Pokomo, living mainly south of Hola, are Christians (Figure 3.9.). Tension has existed between these two groups since the first part of this century as both religions spread. The Malakote increasingly identified the Christian Pokomo with the Colonial government, taxes and forced recruitment for service during the First World War (Elmendorf, 1976; Alila et al, 1979; Fedders et al, 1980).

The riparian agriculture of the Malakote and Pokomo depends on the floods, and is a gamble with recurring droughts (Harris et al, 1934). The effect of the dams upriver on the riparian economy is mainly twofold. During the rains water is collected by the dams and this delays or prevents actual floods, but on the other hand this storage

allows for increase in the dry season flows. This regulated river flow is beneficial for the pump intake of the irrigation schemes at Nanigi (for Bura) and at Laini (for Hola) as it causes fewer unexpected adjustments of the pumps, but is less favourable for the riparian agriculture dependent on the biannual flooding of the river (Adams et al, 1986; Vainio-Mattila,1987; Hughes, 1988).

Annual floods are expected in May-June after the long rains, and December after the short rains (for rainfall see Figures 3.5., 3.6. & 3.7.). Apart from annual floods, the river has a history of a major flood once in every five to ten years, when the whole floodplain, which varies between five and ten kilometres in width, is immersed in water. This floodplain supports the riverine forest, thriving on the silt brought down by the river flow. The water carries a high silt content, varying between 200-300 ppm during low discharge and up to 800 ppm during floods. (Gitonga, 1985).

Because of the impact of the upriver developments described above, cultivation by the river is perceptibly changing to being less flood dependent. Before the irrigation schemes at Bura and Hola, the riparian agriculture was based on crops reflecting the physical environment. Rice-growing in the area has long traditions (Alila et al, 1979), and other food staples were maize, bananas, mangoes and fish. Hunting, now illicit, provided income as crocodile and hippopotamus, as well as elephants and buffalo have inhabited the riverine forest.

Of the cultivated crops, bananas are grown all year round, rice is sown during the long rains and harvested from the end of August to the beginning of September.

Maize is grown during the short rains and harvested in January and February. Mangoes are the most cash productive plant. The selection of crops has changed as the settlement schemes have grown. Such crops as beans and cotton, for example, can be found in riverine villages.

"I grow mangoes, bananas, onions, eggplants, and vegetables. Because of our good soil, me and my two wives can dig a very big area where we make a lot of money. You see this one mango tree the way it has yielded mangoes, I make 7000/= (KShs) per year. If all my mango trees bear fruit you see I will be so rich, you know mangoes are money and our life".

(BICEDA,1987, pg 2)

Exchange between the pastoralist and the riparian cultivators has been based on milk and meat on one side and agricultural produce on the other. The establishment of the scheme has meant a widening of economic opportunities in terms of markets for fuelwood and labour for cotton picking. This growing section of economy is based on kinship networks as nearly 30 percent of the tenants originate from Tana River District.

It is not uncommon that a family based in one of the riverine villages has one or several family members with claims to plots within the Scheme. This creates opportunities for family to use agricultural inputs intended for the Scheme plot for supporting agricultural activities in the home village. The latter tends to be more profitable (as it also is better suited to the environment) than using the inputs on the

Scheme plot.

In the context of the national economy, it has been argued that the riparian economy of the Tana River exists at the periphery of the country's economy and as a result contributes littleto its growth and only marginally shares its benefits (Alilaet al, 1979).

Pastoral economy

The Orma who are the main pastoralist group on the West bank are a Gallaspeaking cushitic people (Figure 3.9.). At the beginning of the century they were the principle group in Tanaland, but are now increasingly dominated by the Somalis, who, according to an agreement in 1915, were to stay on the East bank (Harris et al, 1934). The area between the Tana River and the Somali border remains politically sensitive to this day, with Somali herders making a strong claim to land now within Kenyan borders.

The Orma have a semi-nomadic lifestyle covering some 28 000 km2 to the west of the Tana, including the area on which BISS is located; Before the Scheme was built it was argued that the Scheme would disrupt the Orma lifestyle (Elmendorf, 1976). In particular concern was expressed over the possible loss of pasture and blocking of access from the scrub land to the River Tana along the 30 km length of the project and another 30 km from the weir (op cit).

In the late 1970's when the social background of the area was first being researched

the Orma were considered the richest pastoralists in Kenya. On average they owned 10 cattle + 3 sheep or goats each and enjoyed a 90% diet of meat and milk. Apart from a high occurence of tuberculosis their health was better than that of most other groups (Elmendorf, 976). This situation changed dramatically during the drought of 1983/1984, during which the pastoralists were hardest hit. With the loss of their cattle many have since been forced to look to the Scheme for temporary work in hopes of permanent settlement.

"I lost all my livestock during the drought and now I depend on "Food for Work" ...Now I am just like a beggar, I have decided to settle here in Bura. I willcontinue to look for a job from the Scheme and buy a few animals and settle here. I hope the Government and the BISP willremember and improve our conditions as I know they live better than us. If grass is available for Orma they will settle."
(BICEDA,1987, pg 3)

Other nationalities share the resources of the riverine zone and its hinterland with the Pokomo, Malakote and the Orma. Such groups are the Boni who mainly hunt and fish, and the Korokoro who are honey collectors and bee keepers. No exclusive landownership between the nationalities is recognized in the area.

3.6. Irrigation development in the Tana Basin

Currently there are five types of irrigation development in Kenya. The first, and largest in terms of hectarage, is the irrigation development administered by National Irrigation Board (NIB). The NIB was a product of the 1966 Irrigation Act, and is in charge of

planning, construction, settlement and management of the national irrigation schemes. The first irrigation schemes in Kenya were initiated under the African Land Development Board (ALDEV).With the development of the Mwea Scheme (Figure 3.5.) a need for a central organization was realized, and in 1954 the Joint Irrigation Committee was founded. The "Trust Land (Irrigated Areas) Rules" of 1962 established the rights and obligations of management and tenants on national irrigation schemes. At this time irrigation development in Kenya included 2000 ha of rice in Mwea, 75 ha of subsistence farming and horticultural production at Yatta, 850 ha of cotton in Hola, and newer schemes of Perkerra (growing onions) and Ishiara (Figure 3.10.).

The example of the Mwea Scheme is important for the development of BISS in that it is the only preceeding scheme to match Bura in scale. Mwea is generally regarded as a success among large scale irrigation development schemes and there is no doubt that this influenced the planning of the Bura Scheme. As long as the plans for Bura are implemented in a reduced form (Table 3.9.), Mwea will remain larger. Although the existence of Mwea influenced the establishment of Bura, they are quite different in both physical environment and social structure.

The Mwea Scheme is situated in a high altitude area above 1000 km with an average annual rainfall of over 1000 mm. Its location is extremely suitable for irrigation as it taps two of the three main rivers flowing out of the highest rainfallzone on Mt.Kenya and, furthermore, this water is unusually pure. The soils are fertileblack cotton soils, with an appropriate clay content and no salinity pockets. In terms of social structure

Figure 3.10. Irrigation Schemes of Kenya

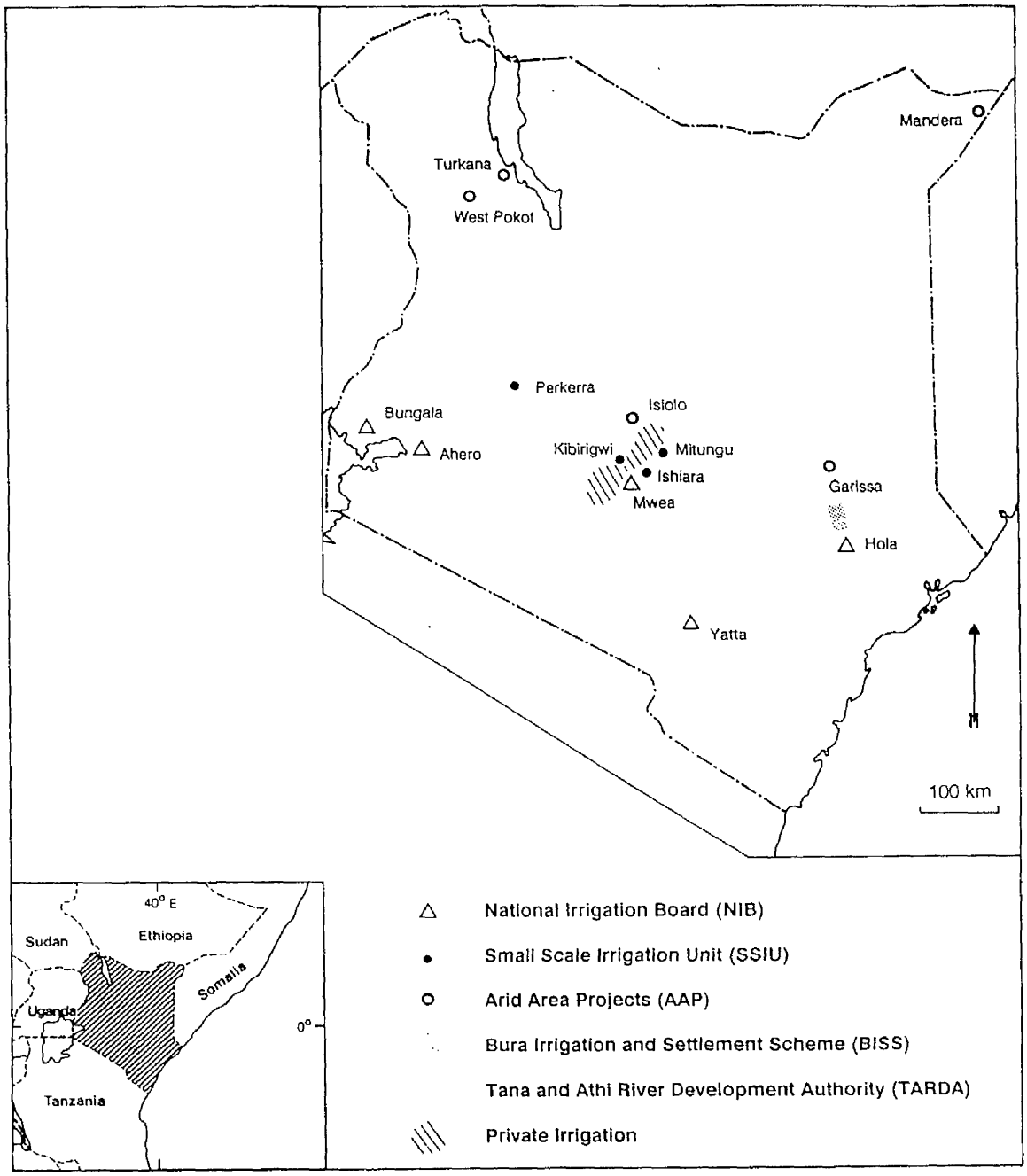


Table 3.9. Planned Small Scale Irrigation Schemes in Tana River District

| Proposed Scheme | Location | Proposed ha |
|---|---|---|
| Oda | Ngao | 150 |
| Ngao | Ngao | 320 |
| Hewani | Salama | 200 |
| Wema | Salama | 320 |
| Mnazini | Ndera | 300 |
| Madogo | Madogo | 100 |
| Garsen | Bilisa | 300 |
| Mlanjo | Saka | 300 |
| Semikaro | Chara | 320 |
| Golbanti | Ngao | 200 |
| Idsowe | Ngao | 200 |
| Kulesa | Salama | 500 |
| Mwina | Salama | 200 |
| Makere | Gwano | 200 |
| Mbalambala | Mbalambala | 200 |
| Gwano | Gwano | 200 |
| total | | 3810 |

Source: Republic of Kenya, 1984a

the Scheme has benefited from a tenant population consisting almost exclusively of one nationality, the Kikuyu, and this has contributed to a successful Mwea Tenants Co-operative movement (Chambers et al, 1973).

The decision to start the Mwea Scheme was made in 1953 shortly after the declaration of Emergency in October 1952. By 1956 the tenant population consisted of 7000 detainees of the MauMau conflict. The Hola Scheme was also started to house detainees. It is important to realize that the rules devised to control these detainee camps are essentially the basis of the 1966 Irrigation Act (Republic of Kenya, 1967).

It was becoming increasingly difficultto co-ordinate the operations of the different

parties involved in irrigation management ie. the Department of Agriculture, the Department of Public Works and the Provincial Administration so the 1966 Irrigation Act (Republic of Kenya, 1967) established the National Irrigation Board, which took over the Mwea, Hola and Perkerra schemes as well as establishing Ahero and Bunyala (both rice schemes) in 1970 (Vainio-Mattila, 1987). At the time of the establishment of NIB, in 1966, 3323 ha and 2163 tenants came under its jurisdiction. By 1980 these had grown to 9538 ha and 5553 tenants. The schemes then included: Mwea, Perkerra, Ahero, Kora, Bunyala, Yala and Hola (Makanda, 1984) (Figure 3.10.).

Secondly, the small scale irrigation schemes are under the jurisdiction of the Small Scale Irrigation Unit (SSIU) of the Land and Farm Management Division within the Ministry of Agriculture. This unit was originally founded to manage increased food production in the high potential areas. Such schemes are Perkerra in Baringo, Ishiara in Embu, Mitungu in Meru and Kibirigwi in Kirinyaga (Makanda, 1984). Thirdly, irrigation developments have taken place within the framework of the Arid Area Projects aiming to settle famine prone nomadic population living in marginal areas of Kenya. Such schemes exist in Turkana, West Pokot, Isiolo, Garissa and Mandera (Makanda,1984) (Figure 3.10.). Fourthly, private irrigationschemes exist in the Central Province. There exists some 10 000 ha of coffee, sugar and high value horticultural crops in the Province. The fifth administrative model is based on the Tennessee Valley Authority (TVA),and one such organization is TARDA (Figure 3.10.). Others exist in the western province as well as in the Rift Valey and eastern provinces (Makanda, 1984).

The first irrigation scheme in the Tana River District existed in the mid-fifties (1953-1957) when a short-lived rice irrigation project existed on the east bank of the river near Hola. In 1956/7 the colonial government started the Hola Irrigation Scheme. The background to this, as also to the Mwea Scheme in Kirinyaga District, and other schemes established at the time, was housing of MauMau detainees. Many of the present tenants in Hola are descendents of these families (Vainio-Mattila, 1987).

There are two major pump irrigation schemes, Bura and Hola and 16 minor pump irrigation schemes planned in the district (Figure 3.4.). The Tana River Scheme at Hola was started in 1956 and covers 873 ha farmed by 600 tenants. In 1979 the potential for minor irrigation schemes was estimated at 3810 ha, of which only 369 ha had been developed by end of 1978 (Table 3.9.) (Alila et al, 1979). The 1974 estimate was that in the middle Tana basin there were in total (both irrigated and not irrigated) 2398 ha under crop cultivation. (Alila et al, 1979)

In 1974, 18 820 ha of the Tana Basin was under irrigated crop production, and of this all but 4 820 ha was under coffee, commercial horticulture and cotton production. Irrigation production at this stage was controlled mainly by multinational companies with the newly emerged Kenyan bourgeoisie as a partner and geared towards the needs of corporate accumulation, rather than needs of the riparian communities or individuals. Irrigation development in the Tana Basin has been criticized by Saha for relying on a technocratic strategy of increasing agricultural production by introduction and/or expansion of irrigation, fertilizers, improved seeds and pest control. He argues

that the social dimension of irrigation development has been ignored by the planners (Saha, 1982).

This social dimension he defines in the following terms:

"From the planning point of view irrigation has to be seen as a territoriallyorganized system of production involving a particular combination of material and social means of production for achieving a given set of social objectives. The social objectives need to be formulated in terms which are relatable to broadly recognized needs of the population, eg. production and availabilityof more food, creator of more employment and generator of increased incomes leading to higher levels of consumption and welfare for the broad mass of population."
(Saha, 1982, pg 273)

3.6.1. Bura Irrigation and Settlement Scheme (BISS)

The irrigation potential of the Tana basin has been evaluated by various organizations from the beginning of the century. The colonial government expressed interest in possible developments in 1930's when the "Tana River expedition" was carried out. Their conclusion in 1934 was that only Upper Tana was a feasible area for an irrigationscheme. On the Middle tana, the Bura Scheme's present location, itwas said that

"Any considerable development in this reach (between Bura and Garsen) is impracticable."

(Harris et al, 1934, pg 3)

Mainly two factors influenced these conclusions. Firstly, the instability of the river banks, because it seemed to change course as a result of the floods. Secondly the construction of headworks would, due to the remoteness of the area, be very expensive (Harris et al, 1934). The same conclusion was reached at the end of the 1940's when the colonial government was again planning irrigation development between Grand Falls and Bura. This time the poverty of the soils was added to the grievances.

After independence (1963), the government commissioned two consultants, ILACO (Netherlands) and ACRES(Canada), to carry out a study of the lower irrigation schme. This study was completed in 1967, and as the results were disappointing, the Netherlands were willing to finance further studies of the Upper Tana basin. The main development between the two feasibility studies carried out by ILACO(presented in 1973 and 1975) was that the Netherlands indicated willingness to finance the second study only if a financier could be found for the Scheme, in the event that it were feasible. The government of Kenya approached the World bank, and their involvement in developing BISS started in 1973 (Republic of Kenya, 1977; World Bank, 1984; Vainio-Mattila,1987)

Among all the studies carried out in the area there is not one that unreservedly recommended the establishment of an irrigation scheme where the Bura Scheme now exists. To get around the most important problem of all, that of poor soil quality, the

soils were upgraded. The soils after upgrading and the actual soil qualities as derived from soil maps of the Scheme are compared in Figure 3.12. On the basis of this I would argue that the force behind the development of the Scheme was not primarily economic, as it was clearly unlikely that productivity targets would be reached, but rather the reasons for the scheme's development were influenced both by internal and external politics.

The Bura Scheme was conceived to meet the growing problem of landlessness in Central and Western Kenya, as well as to utilize the irrigation potential of the River Tana in order to increase productivity of land around it. By growing export quality cotton, the scheme would also contribute to the national economy. Bura was expected to grow 70% of Kenya's export cotton (Elmendorf,1976). The hopes of the Kenyan government were that the Scheme would create employment, contribute to the reduction of the landlessness problem by settlement, raise agricultural productivity and save foreign exchange (World Bank, 1984). The Kenyan government gave the Scheme high priority, partly because it fitted into the national irrigation development plan but more so because they expected to support through irrigation a high density of population by resettlement of people from presently over-crowded population centres (Elmendorf, 1976).

The success of the Mwea irrigation scheme in profitable rice production, and in settlement, gave the encouragement needed for attempting such an ambitious effort. These large scale irrigation and (re)settlement schemes were a patent solution to land and water shortage in the 1970's throughout the semi-arid and arid regions of Africa.

As a method of agricultural expansion they were particularly favoured by the World Bank. By the time Bura was being planned, lessons from Nigeria and Chad, where other World Bank schemes existed, for example, should have been learned. In general the large scale irrigation development efforts had been up to ten times more expensive in Africa than in Asia, with marginal or no benefits in terms of land reclamation for increased production in agriculture. (Bird, 1983; Seeley et al, 1988)

An external policy factor was the history of border difficulties between Kenya and Somalia. It was hoped that the settlement of hundreds of tenants from elsewhere in Kenya would have a calming impact on local politics. That the situation is ongoing was borne out by the incident in February 1984 when 800 Somalis were killed as a result of conflict with the Kenyan Government (Harris et al, 1934; Guardian, 1984).

In 1987 Bura Irrigation and Settlement Scheme was targeted to grow 3000 ha of cotton, and the number of tenants on the Scheme was 1871 In size the scope of the Scheme had changed greatly through various proposals, and usually a change meant a reduction in scope. These changes have been related to finding the optimum alternative for feasible irrigation development in the area (Table 3.10). The following section will explain what criteria were used for the selection of tenants.

Table 3.10. Change in Scope of the Bura irrigation and Settlement Scheme

| Source | suggested ha | suggested no of tenants | estimated cost (KShs) /ha | /family |
|---|---|---|---|---|
| 1973 ILACO | 4000 | 3000 | 23850/= | 49000/= |
| 1975 ILACO | 14560 | 1078 | 23850/= | 32000/= |
| 1977 World Bank | 6700 | 5150 | 114322/= | 148737/= |
| 1977 Rep. of Kenya | 6700 | 5150 | 139701/= | 181747/= |
| 1983a Rep. of Kenya | 3900 | 3000 | 18800/= | 24400/= |

Tenant selection

The criteria for tenant selection were modified through the differentplans. For example it was suggested at one stage (draft Project Planning Report) that tenants should be males of a certain age. Later it was decided to remove this discriminating criterion. As Elemendorf point out (1976), women are responsible for 75% of agricultural work in Kenya, and 1/3 of rural households are female headed. (According to 1969 census there were 525 000 rural households.)

The criteria that actually were used for tenant selection were as follows:

"The prospective tenants should be:

a) landless, unemployed or underemployed, or shall be earning a return far below the average for the area.

b) the age of the head of household shall be between approximately 25 and 45 years.

c) preferably have had previous experience in farming and shall have aptitude for irrigated farming.

d) shall not have demonstrated any social habits which might adversely affect his ability to carry out his previous responsibilities.

e) he and his family shall be physically fit to undertake farm work.

f) to provide, within the family, four adult equivalents of labour."

(Republic of Kenya, 1977)

The selection was caried out on quota basis from each district through the Chief's office, and the Settlement Office of the NIB.

The headman of Village 1 arrived from Bungoma (in Western Kenya) on 17.3.1982 and described his feelings:

"I arrived with ten other heads of families from my village. In Kisumu we joined others on the train to Mombasa. We were very happy. The train had a banner which said "Settlers for Bura", and we thought we did something for nationbuilding and our families. We were singing on the train and thanking God. When we arrived in Bura we had to sign contracts to become tenants. I did not know what it meant, but I looked it up in a dictionary. It said "hired labour". But this is not the same as settlers. Sisi tu hapa kama detainees (we are here just like detainees."

(interview)

I found that frequently those tenants whose Scheme plots did not produce expected harvests accrued substantial debts, whereas tenants with financial resources outside the Scheme would become money lenders. It was evident that in practice the criteria were at times waived (de Leeuw, 1982). This meant that instead of tenants starting with the same resources in terms of labour and land, for example, there were significant variations in the resources people had access to on arrival in Bura. As one tenant said:

"Walikuja kama havana, kumbe wana sana" (They come as if they had nothing, but surely they have plenty)
(interview)

The tenants originate from all districts of Kenya, thus they represent varying ethnic and agricultural backgrounds. In the following section I will focus on some of the aspects arising from this variety.

Human geography of BISS

The ethnic composition of the ten Scheme villages is presented in tables in Appendix 3. There were ten villages on the Scheme with 140-250 tenant households in each. The population of each village consisted of a mix of at least ten Kenyan nationalities. This meant that the villages were quite different in ethnic character. Major distinctions in the backgrounds of the tenant families were;

a) whether the villagers were predominantly from the Tana River area or had immigrated from elsewhere in Kenya;

b) whether the villagers had predominantly a nomadic background or a farming background;

c) whether the villagers were predominantly Muslim or Christian.

The villages were managed through a structure of committees overseen by BISS management but not unlike the Local Development Committees. The villages had a dual leadership in the sense that most villages had both a chairman and a headman. The chairman was nominated by the Scheme and was responsible for village committee accounts as well as for a village register. The headman's role was stronger in arbitration and negotiations. In some villages with several strong ethnic groups there were two or more headmen.

In each village groups were organized on the basis of ethnic, religious or linguistic affiliations. There were also groups that were bound together by a common aim, such as women's groups and self-help groups. Some of these groups were very organized with a committee and regular meetings, for example. They were usually born out of an initiative by some active person or persons. Other groups, such as those based on ethnic loyalities, had at times little relevance, but in times of dispute could be very important indeed.

The ethnic background of the villages was very complex. There were at least ten different self-identified ethnic groups represented in each village. By far the largest ethnic group on the Scheme were the Kikuyu, in five of the villages they were the biggest group. This group has a strong history as a politically dominant group in Kenya, especially during the presidency of Mzee Kenyatta. In villages where the ethnic distribution was more varied, and there was no one dominant group (compare Villages 6 and 10 in Appendix 3) organization was more difficult.

My perception was that people from the area seemed to have a stronger support structure around them. The Scheme was in the relative vicinity to their homes and families, they were knowledgable of the area, its resources and had more ready access to the local political structure. Often people arriving from outside had to deal with the issue of cultural isolation, especially if they were of a small minority in a specific village. For example, in one village we were approached by a woman enquiring why it was that there was smoke coming through the walls of her neighbours' houses. These neighbours had for some time been actively involved in the stove programme and were in fact themselves training other villagers the skills required to build the stoves. But since the woman only spoke her own language (kimeru) not related to the language of the neighbours (malakote) there was very little communication between them.

Most of the tenant families had been engaged in farming also before arrival in Bura. However, Villages 8 and 9 were inhabited mainly by previously nomadic people. Some villagers in these villages had a specific role in livestock management. The Irrigation

Act officiallyforbids livestock husbandry within the Scheme boundaries (this was not very stringently enforced), but as the Somali and Orma villagers had access to grazing lands around the Scheme, it was not uncommon to find reciprocal arrangements whereby livestock husbandry was exchanged for help with cotton fields.

In our work religion became an issue in the initial stages for approaching a predominantly islamic village. I was personally often identified with the only other single, white women in the area who were American Maryknoll Sisters. However, this was a misconception that was fairlyeasy to clarify. Religion was a strong divider in the villages also in the sense that in a Christian village the Muslim villagers had to be specifically reached with information on the stoves and other activities as the network of the Christian villagers seldom reached the Muslim villagers. The opposite was true in Muslim villages.

Religious affiliations were also strong. The division between Muslims and Christians did not necessarily denote disagreement, but the prejudices toward different customs, and difficulties caused by lack of common language, serve to emphasize to the rift. Also the Muslims seldom held important ceremonies in the Scheme villages. For example, for cricumcision children were taken back to the place of origin. This was true to some degree with the Christians, but whereas there were several churches in each village, there the were only two established mosques in the Scheme area.

In terms of fuelwood, cooking practices or other related aspects suprisingly few differences were manifested. This was probably largely due to the fact that there was

Figure 3.11. Bura Irrigation and Settlement Scheme

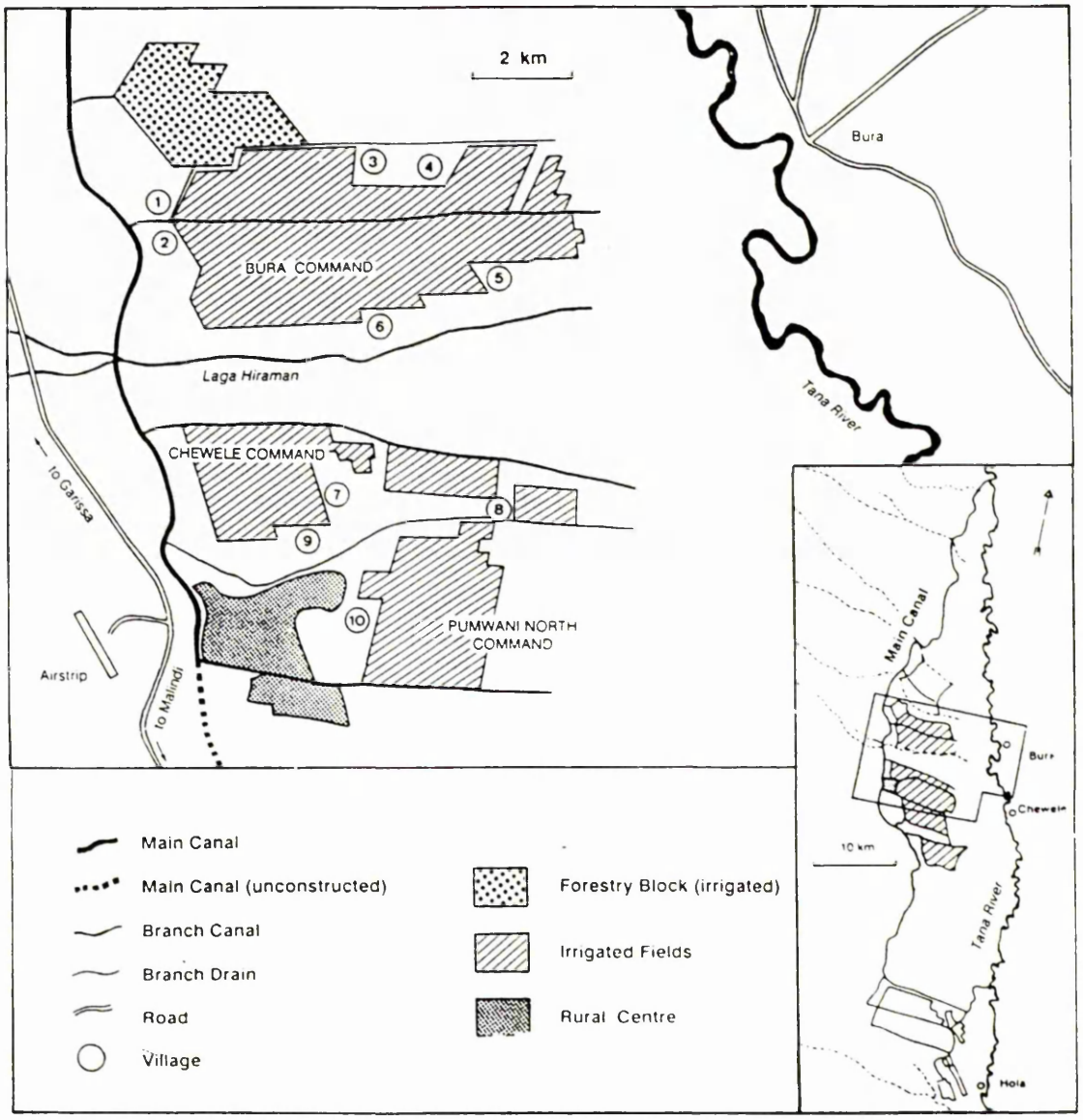
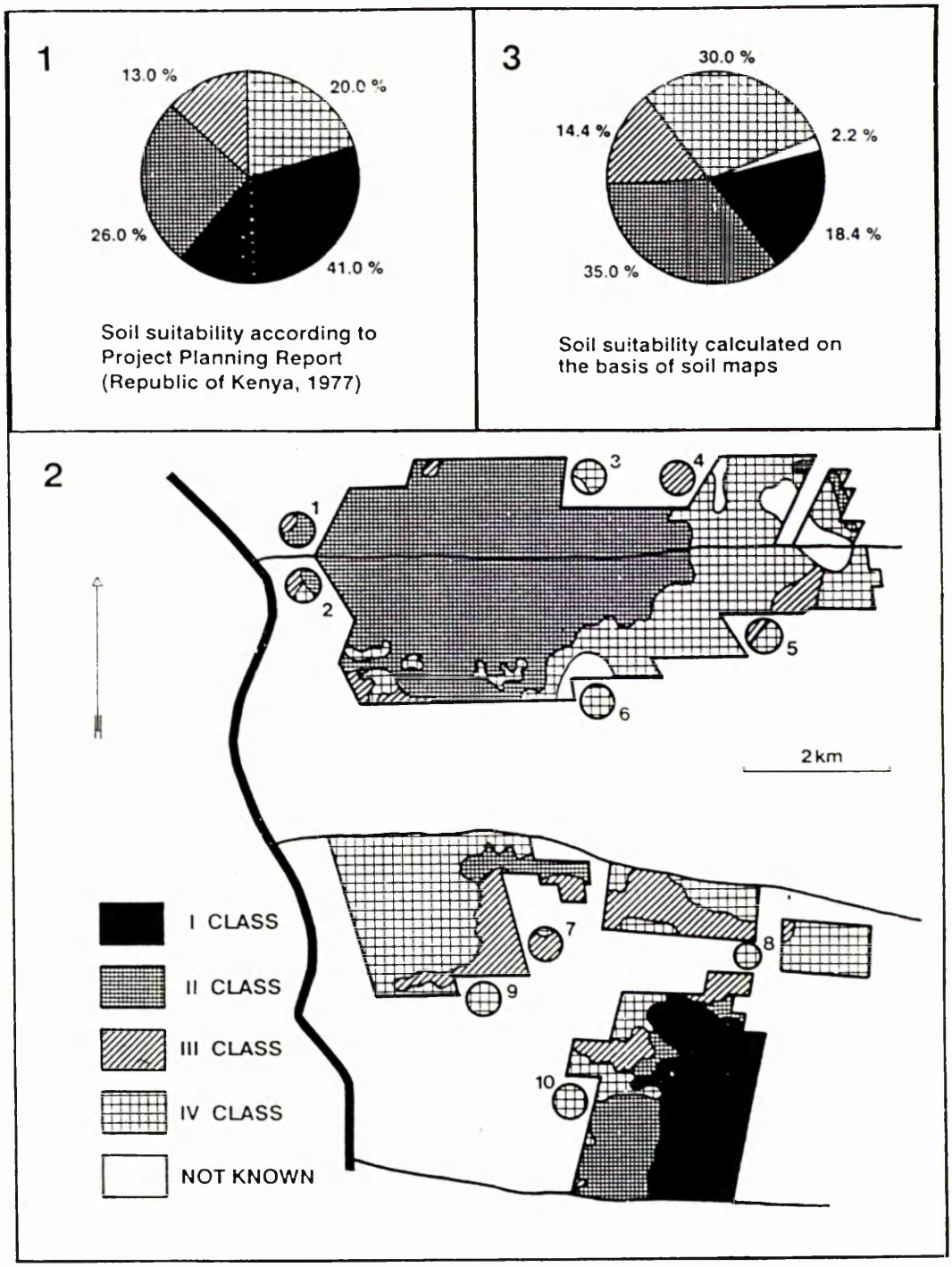


Figure 3.12. Comparison between Soil Quality in Bura According to Project Planning Report and Soil Maps




Note Diagram 1 has been drawn based on assumptions of the Project Planning Report regarding soil quality. The map in diagram 2 has been drawn on the basis of existing soil maps of the area. The percentages in diagram 3 have been calculated on the basis of the map

no variation in fuel or foodstuffs available to the farmers. Difference in attitudes to stoves between people from the riverine area and people from elsewhere in Kenya is discussed in Chapter 7.

The following analysis of the agricultural system is important to the understanding of some of the basic fallacies in the assumptions on which the scheme was developed.

Agricultural system

The agricultural system of Bura Scheme is based on settlement villages where, in 1987, some 1900 tenants cultivated assigned plots. Each tenant cultivated two plots of 0.625 ha each. On these plots he expected to grow two crops of cotton annually, ultimately for export, and of maize for subsistence. The rotation on these plots is explained in Figure 3.13.. The time used for each activity in Figure 3.13. is as follows: planting cotton, approximately four weeks; husbandary, six months; harvesting, approximately six weeks; stalk cutting, one week; and maize, three months. Each field is left fallow for the maize growing period every other year. The yields expected for cotton and maize in the Project Planning Report are shown in Table 3.13. On the basis of these expectations the average net income of a tenant was estimated to be KSh 11 700/= in the third year of the Scheme operations (Republic of Kenya, 1977). In fact the realization has been 22% lower as in the actual third year of 1984/85 an average net farm income of KSH 9 100/= was achieved. (Gitonga, 1985)

My argument is that this failure to reach estimated levels of returns is due to

fundamental errors regarding the classification of soils. According to the Project Planning Report the soils of BISS could be classified as in Table 3.11. (Republic of Kenya, 1977) In compiling Table 3.12. I used soil maps produced by the planning and implementing consultant for the Scheme construction, Sir M.MacDonald and Partners. I arrived at the classification of soils in classes I to IV by converting the chemical soil classification units marked on the maps into classes depicting soil suitability for irrigation used in the Project Planning Report. Table 3.11. gives breakdown of soil suitability in the Scheme commands (FAO/UNDP,1968; Republic of Kenya, 1977). The comparison of these two tables leads me to conclude that less than half of the area assumed to be I class soil exists, and that all of these soils are situated in one command of Pumwani North (Figure 3.11.) which is farmed by Villages 8 and 10. I have illustrated the discrepancy between estimations on soil quality and existing soils in Figure 3.12.

Another comparison can be made between Tables 3.13. and 3.14. This comparison supports the above in that in no year since 1981 has the average yield per hectare for cotton been more than the yield expected for IV class soils. In 1982 the average maize yield reached expectations set for IIIclass soils, but since then also maize yields have remained below expectations for IV class.

On the basis of this I would argue that BISS was established on very unrealistic assumptions. Consequently the villagers must seek ways of supplementing agricultural income and are faced with severe resource shortages. In this kind of situation the

Table 3.11. Proportion of Soil Classes on BISS as in Project Planning Document

| soil class | % of BISS (6700 ha) |
|---|---|
| 1 | 41 |
| 2 | 26 |
| 3 | 13 |
| 4 | 20 |

Source: Republic of Kenya, 1977

Table 3.12. Soil Classes in Commands based on Soil Maps

| Class | % of total agricultural land on BISS | % in Bura | % in Chewele | % in Pumwani North |
|---|---|---|---|---|
| I | 18.4 | -- | -- | 45.6 |
| II | 35.0 | 60.6 | 3.8 | 22.9 |
| III | 14.4 | 2.3 | 32.5 | 18.0 |
| IV | 30.0 | 30.4 | 63.7 | 13.0 |
| not known | 2.2 | 2.2 | -- | 0.5 |

Source: Soil maps from Agricultural Department of BISS

Table 3.13. Expected Crop Yields Related to Soil Classes (tonnes/ha)

| | class 1 | class 2 | class 3 | class 4 |
|---|---|---|---|---|
| cotton | 3.4 | 3.0 | 2.6 | 2.4 |
| maize | 4.1 | 3.7 | 3.1 | 2.8 |

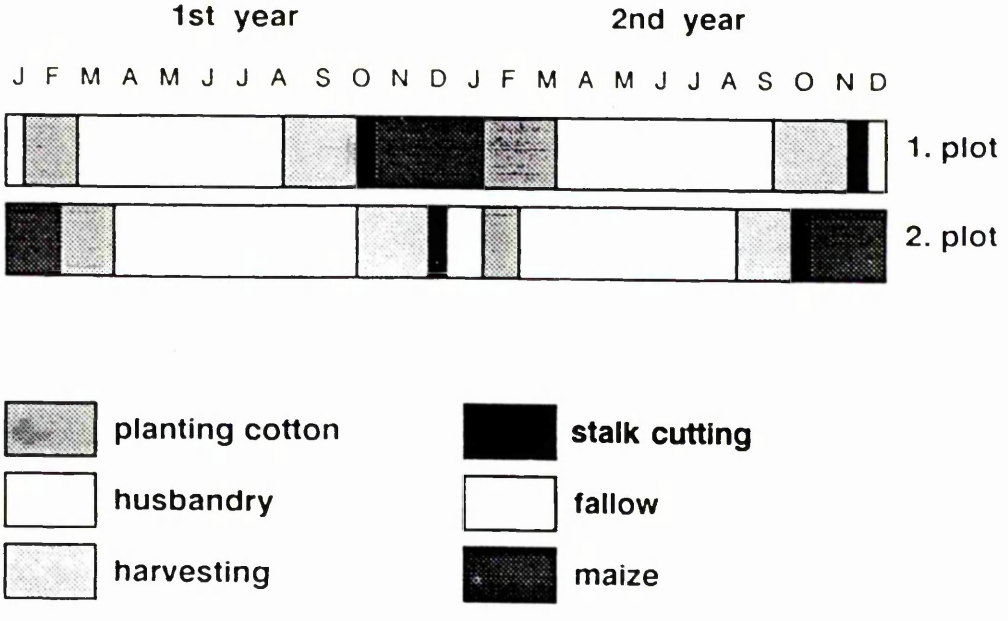
Source: Republic of Kenya, 1977

Table 3.14. Progress 1981-1984

| Year | No. of tenants | ha cultivated | average yield kg/ha |
|---|---|---|---|
| 1981 | 320 | 200 maize | 2800 |
| 1982 | 800 | 440 maize | 3000 |
| | 800 | 740 cotton | 2210 |
| 1983 | 800 | 635 maize | 2200 |
| | 800 | 740 cotton | 2000 |
| 1984 | 1800 | 620 maize | 2000 |
| | | 2010 cotton | 2195 |

Source: Gitonga, 1985, National Irrigation Board, 1985

Figure 3.13. Rotation of Crops on tenant Plots on BISS




Source: Vainio-Mattila,1987

farmers have very littlecontrol over their livelihoods. The low agricultural output has also resulted in politicalpressures and in frequent changes of administrative structures of BISS.

## 3.7. Conclusion

Kenya's national development strategies have been efforts towards modernization. These strategies are reflected in wanting to decrease the dualism of the Kenyan economy through africanization (ie. modernizing the African economy) and through emphasis on the rural sector (ie. modernization of the rural economy). In both cases modernization is seen as a process through which the sector perceived as being in need of modernization is to be brought to the level of an already "modern" sector.

During the Harambee Era, Kenyatta's strategy for modernization consisted of a strong role played by the state in development investment and protection of private property (Kituy, 1987) and the encouragement of community level self-help groups to work towards community self-sufficiency in the provision of social services. Arap Moi, duriong the Nyayo Era, has continued to encourage these self-help groups in the name of "nation building", but has discouraged the combination of economic and political power, mainly with the intent of weakening the power base previously existing among the Kikuyu in the Central province.

Tana River District has been, due to its location, climatic conditions and cultural difference, in the periphery of national development during both Eras. The irrigation

potential of the area immeadiately surrounding the river has attracted some investment. It is an area which specifically ought to benefit from the modernization of the rural sector.

The area affected by the construction of Kenya's second largest irrigation scheme, BISS, has been described in this chapter. Firstly, BISS is a settlement scheme and thus most of the tenant population is from outside the district. And secondly, one of the reasons for World Bank investment in BISS was the hope for production of export quality cotton. Consequently the main benefits, had the harvests been successful, would have consisted of a contribution towards the GNP. This does not mean a better life for the population in the area. From Table 3.3. it can also be inferred that the contribution of cotton to export has, even since the first harvests in BISS (1982), been minimal. I argue that modernization is not an appropriate strategy for the development of the rural sector.

Since 1983 the District Focus for Rural Development has changed the process of district development planning. This policy has been criticized as not functional, but I have argued here that if it were implemented (including district control over funds in practice) it would facilitate district specific development. I have argued particularly that it provides a framework for development aid programmes at administrative levels of the district and smaller entities. However, this means that programmes should be directed specifically at institution strengthening.

The modernization strategy for developing the rural areas in Kenya does not take into

consideration the centralized power structure of the overall economy of the country. Programmes that primarily contribute to the growth of the GNP can be argued to enforce the drift between the periphery and the centre. In order to initiate real growth in the rural districts it is necessary that district development planning is based on existing needs and building the capacity of district administration to implement strategies. The DFRD can function as a tool for this but in reality its potential is largely ignored by donors.

The BISS could be arguably the most ambitious of all irrigation schemes in Kenya. Its establishment is a part of a larger plan for utilizing the Tana River and its basin area. This plan is being implemented by various authorities who have responsibility for specific schemes. No authority, even TARDA, can be said to have an overall plan for the development of the irrigation and hydropower development of the area. One consequence of these developments, and the fragmented administration, has been competition between the new river flow regulating schemes and the flood dependent economy of the River Tana. It is feared that one ultimate result of the settlement scheme in Bura will be the displacement of people who now live between BISS and the river.

It would be easy to conclude that BISS is a badly planned, inappropriate development scheme that fails even in its own aims to say anything about assessing the scheme against ideals about sustainable development. The other side of the coin is that as a large scale irrigation scheme it is very young and has not faced problems beyond those, for example, faced in the first year of Mwea. But while it could be argued

that the tenants who moved into the area and stayed are now doing better than before, and have hopes of permanency in terms of titles to land and houses, it is the cost of this development that should be weighed carefully before initiatinganything like it elsewhere. In the assessment of these costs there is a certain degree of hopelessness in the face of the feeling that the lessons could have been learned before.

The costs in Bura are financial in that the highly escalated development cost of the Scheme has resulted in BISS now being heavily reliant on Kenyan government subsidy. The costs in terms of human displacement of both the original inhabitants of the area and also of the tenants, among whom the death toll in the first year due to inadequate health services and water poisoned by aerial spraying of cotton, for example, was high. In view of these costs it is not suprising that in the mid-term evaluation the World Bank recommends that the Scheme should not be replicated in any other semi-arid area of Kenya (World Bank, 1985, pg 47).

In this chapter I have also illustrated that the resources of the tenant households to design and implement their own development strategies were meagre. The legislation of irrigation schemes in Kenya limited their choices and the semi-arid environment, to which most tenants were strangers, was a constraint for the diversification of agriculture.

In the following chapters I will focus on the case study in Bura. Through these chapters I willshow that the impact of aid is at its most powerful at the local level and

that PRA has potential to empower aid recipients to design and implement their own development strategies. The problem around which the case study evolves is domestic fuel shortage, and the study itself is a forestry project.

# 4. THE FIELD RESEARCH PROCESS IN BURA

## 4.1 Introduction

The Social and Economic Research Programme (SERP) was carried out as a component of the BFPP. The first active steps towards carrying out the socio--economic research were taken by the Department of Silviculture, University of Helsinki, which sought the co-operation of the Institute of Development Studies, University of Helsinki, in the spring of 1984. In October 1984 a preliminary study for the Social and Economic Research Programme (SERP) was initiated under the auspices of the Silvicultural Research Programme (FORP), which had begun earlier in the year, and which I carried out in Bura. The report on this study was presented in February 1985 (Vainio-Mattila,1985b), and based on this I prepared a research plan for the IDS Helsinki (IDS Helsinki, 1985). Later, this was modified to include the research co-operation between IDS Nairobi and IDS Helsinki. The final research plan (IDS Helsinki et al, 1985) was ready in August 1985.

Socio-economic studies in the forestry sector are based on the realization that rural afforestation programmes in particular depend for their success on the participation of the local communities. Hence there must be an understanding of the local forestry practices and existing local knowledge, as well as of other social and economic aspects of rural life. These aspects include, for example, household economics and landuse systems as part of the farming systems. In this context the "socio-economic" refers usually to systems at the micro level and is seen to be of particular importance

in programmes with some kind of social forestry[1] approach. (FAO, 1978 & 1984 & 1985)

During the planning of BFPP, research was perceived as an important component of the envisaged forestry development in Bura and this was reflected already in the first implementation plan (Hakkila et al, 1982). Emphasis was put on development, documentation and research, but within the research only topics directly concerned with forestry were considered. These topics included: nursery studies, fuelwood species trials, management studies, studies on mixed plantations, work studies, utilizationstudies and economic studies. Under utilizationstudies it was noted that an improved stove programme would have to be separate and could not be combined with the forestry programme (Hakkilaet al, 1982, pg 45). Apart from this no reference was made to the users of the fuelwood plantation.

By the time the revised implementation plan was produced (Hakkilaet al, 1984), the idea of social and economic research had matured so that the following studies were proposed:

"socio-economic studies concerning background data on the Bura settlement, establishment and utilizationof tree plantations, socio-cultural and ecological aspects of firewood use, economy of the tenants, co-operation and organization as well as extension."

Hakkila et al, 1984, pg 38)

[1] "social forestry" is "any form of forestry designed specifically to deliver benefits to the local population, regardless of whether the local people actually participate directly in forestry production or not" (Raintree, 1989)

The mission which produced this plan also included a social scientist, and the first research plan was prepared in the spring of 1984 (KellesViitanen, 1984). Through three versions of research plans (Kelles-Viitanen 984; IDS Helsinki, 1985; IDS Helsinki et al, 1985), the aims and scope of the research were modified from a fairly ambitious research proposal (covering various sociological and anthropological aspects from health and education to the meaning of ethnicity in conflicts within the area), to a research programme closely related to the fuelwood project itself. The stove programme was increasingly considered as important, although it was never fully integrated into the plans for BFPP. This meant that no decisions on the type of stove or its production system were made before the research began.

## 4.2. Purpose and aims of SERP

The purpose and aims of SERP were defined in the final research plan (IDS Helsinki et al, 1985). It was to use participatory research to approach the following research problems:

"1) Social and economic analysis of present fuel production, distribution and consumption patterns. 2) Determining means of reducing woodfuel consumption to an acceptable level and identifying alternatives for woodfuels. 3) Analysis of existing social structures and organizations for opportunizing tenant participation in the Fuelwood Project, and for a basis of planning the administration of the fuelwood plantation at the village level."

(Vainio-Mattila,1987, pg 3)

Apart from these "official" aims, different expectations were levelled at SERP regarding its outcome by the various interest groups involved in both its planning and implementation. In the following sections I have summarized the expectations of FINNIDA as the funders, BFPP as the implementor of the fuelwood plantation project, the Silvicultural Research Programme (FORP) as another, simultaneous research concerning BISS and BFPP, the Universities (meaning IDS Nairobi and Helsinki) involved in SERP as well as the expectations of the tenants of BISS. A distinguishing feature of these hidden agendas is that whereas the tenants would like to have the results to provide practical solutions to the fuelwood shortage, BFPP in particular expected quantitative data to support its strategy. The issue of what kind of results are possible with PRA is reconsidered in Chapter 8 when the impact of SERP in Bura is discussed. (Figure 4.1.)

FINNIDA

FINNIDA, as the funder of SERP, was probably the only institution with well defined expectations regarding the outcome of the socio-economic study. For FINNIDA, SERP had value if it produced data that could be used. It was expected that through the research it would be possible to identify existing social and economic systems in Bura so that these could be utilized for increasing tenants' participation in the project itself. SERP was expected to support the implementation of BFPP by providing relevant information on the tenant households. This corresponds well to the second definition of participation by McCall (1987) discussed in 2.2.2.. It could also be argued that FINNIDA was at this time (1984) becoming aware of the importance attributed studies

of this kind by other international donors. However, at no time were any terms of reference designed for SERP or any expectations expressed in writing.

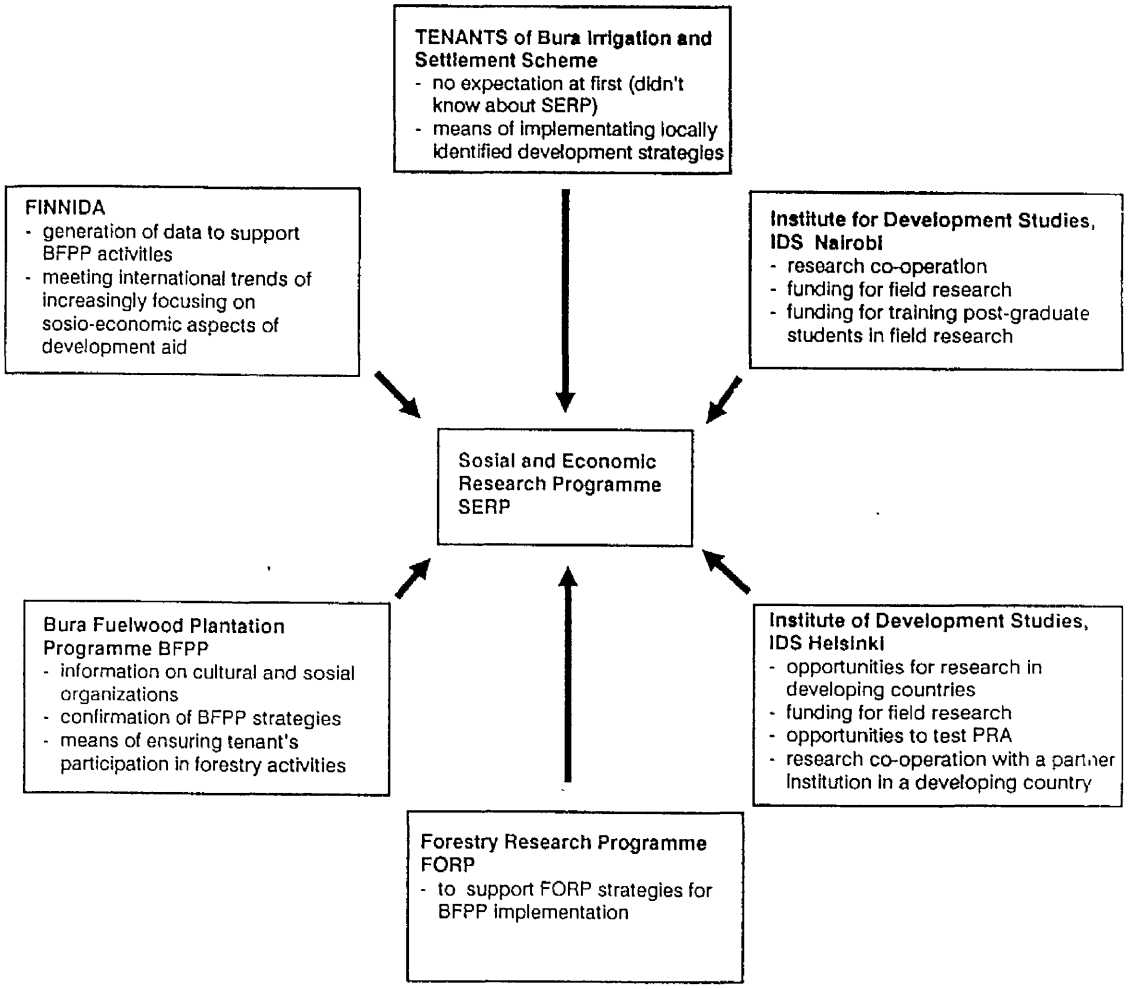
Bura Fuelwood Plantation Project

It is difficult to assess any expectations held by planners and implementors of the BFPP may have had of SERP as the implementation of BFPP only begun in May 1986 and the main phase of SERP fieldwork came to an end in June 1986.

By May 1986 the two research programmes (FORP and SERP) were established as separate from the implementation component and their relationship with BFPP focused on the use of the research. By this I mean that BFPP would incorporate any part of FORP or SERP that would serve to strengthen its strategy for fuelwood plantation. At the time socio-economic issues were not regarded as in any way crucial to the project by the implementing consultant and within the project in fact there existed very little awareness of what the research could do for it. The consultant's expectations were more directed towards FORP which was expected to yield hard data on forestry. SERP was expected to confirm BFPP strategies and to provide means for ensuring tenants' participation in the project in order for the communities to take on some of the responsibility for forestry activities vested in the implementing agent.

The implementing agent did, however, evaluate SERP in May 1987. According to this evaluation the aims of SERP were to obtain baseline data on the economy of fuel in households, to test alternatives to firewood, to test alternatives for saving firewood

Figure 4.1. Great Expectations: What the Various Interest Groups Expected to Gain from SERP




Source: Vainio-Mattilafor this thesis

and to analyze the social organization of the villages as a basis for administration of the fuelwood plantation project (Pesonen, 1987). In the opinion of the evaluators the choice of the research approach demonstrated that SERP served primarily the interests of academic research ambitions. They thought that at the end the approach had been right for developing a relationship with the tenants but they were at a loss when it came to using such qualitative data. (op cit, 1987).

Universities

For the two Institutes of Development Studies (Helsinki and Nairobi) SERP represented an opportunity in research co-operation and training of researchers in fieldwork as was defined in the research plan (IDS Helsinki et al, 1985). For both of the Institutes SERP represented substantial funding and thus potential for institution building. It also meant access to field research which at this time was increasingly difficultfor both overseas and national institutions in Kenya.

In terms of academic interest for IDS Helsinki, SERP represented an opportunity for assessing the use of participatory research methods within a development aid programme. As the IDS Nairobi research was based on a more conventional survey methodology there was an opportunity for comparison.

Tenants of BISS

An outstanding feature of the villages in Bura is their ethnic diversity (see Chapter 3 and Appendix 3). This diversity was reflected in such matters related to BFPP, as knowledge of trees and diets. Depending on the place of origin and nationality, the tenants would recognize different species, and have differing uses for them as well as different beliefs about them (Alakoski-Johansson et al, 1986; Vainio-Mattila,1987)

Although the tenants were the main interest group in SERP they were the last to know about it. Their expectations were built up during the research process. This process is described below and it is shown how SERP became to be recognized by the villagers as a process through which they could effect changes. This does not mean that it was always, or even frequently, possible to implement development strategies created by the tennants. These expectations were directed at SERP by tenants because active extension in the villages was one of its visible features and because the stove programme meant a change in a very definite way. In fact one of the frustrations of working within the forestry sector was the restrictive nature of sectoral administration and the inflexibility of a programme within such a sector.

It is difficult to say exactly how much these expectations affected the implementation of SERP. Certainly it involved a conscious effort to meet the tenants' expectations. The awareness of the tenants' expectations was largely created through networking, which was a central technique used during the research process. This process is discussed in the following section.

## 4.3. Methodology and research process

Before analysing the field research process, it is necessary to point out that in the field the research team consisted of three people: the "resident anthropologist" (myself) and two research assistants, who were both Kenyan women living in Bura. The research assistants had formerly been employed in casual employment by the Scheme and had no "academic" background. They had both left school after Form 4 of secondary school, at about 16 years of age. One of the long term aims of the research process was to train the research assistants to carry out extension work in the villages even after the SERP had come to an end. This was reflected in the interview strategy so that the main purpose of the semistructured interviews was to ensure that the research assistants would get to know the villagers they worked with, and become known in the villages where they were to be involved in extension work.

The following field methods were used in addition to secondary sources to obtain the materials used for this thesis:

- Networking (discussed in depth below 4.3.1.)
- Analysis of soil maps (discussed in Chapter 3)
- Measurement of firewood consumption (results in Table 7.2.)
- Measurement of samples of dry cotton stalks and maize cobs, as well as recording of household experiences on using these for cooking, to get and indication of the quantities of agricultural residues available for domestic fuel
- Organization of the training for building improved stoves together with the villagers (Chapter 7)

- Structured and semi-structured interviews

Interviews were one technique used in learning about the people in Bura and their life circumstances. The interviews were also used in order to initiatedialogue between the research team and the villagers. It is more accurate to think of the interview questions as fields of interest than to presume them to be questions designed to obtain statistically relevant data. There was, nonetheless, some structuring in the interviews.

Firstly, their main purpose was for the villagers and the researchers to get to know each other. One of the two research assistants would always be carrying out extension on a long term basis in the village (both of them had five extension villages) and it was particularly important that she would be well known in the village before the extension started.

Secondly, there were some fields of interest we always wanted to cover in the interviews. The specific questions asked could vary and the interview could take place in parts over the period of time but we would do our best to cover all the fields in Appendix 2 with each respondent.

Thirdly, the respondents were partially chosen according to deliberate stratification. The first respondents were usually from among the group we met first, that is the community leaders and their families. When we got a list from the village headman indicating the proportion of different ethnic groups in the village, we would then attempt to select our respondents in the same proportion. An additional criterion was

added later in each village. When the stove programme was well under way we would attempt to interview respondents who were not involved in the activities as well as those who were. This gave us an additional perspective to individual priorities in the village.

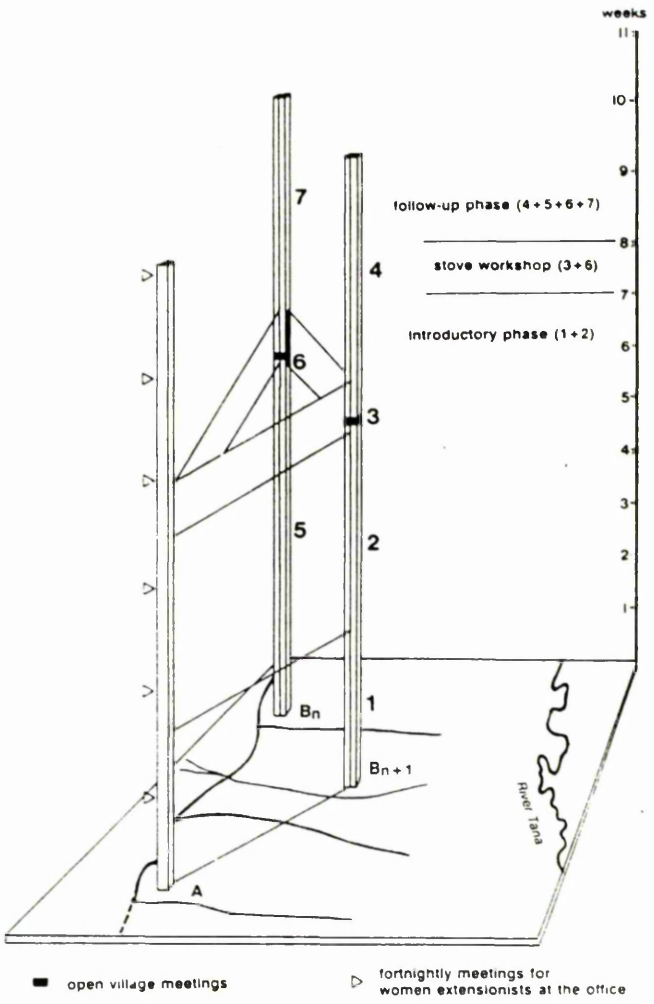
The interview in Appendix 2 was carried out on average with 18% of the villagers in each village (for sample size and structure in each village see section E of this Appendix). In order to expand our understanding of the lives of the villagers in longer term, I designed the "Habari- theme" technique. "Habari" is Swahili for "news" and is commonly used in greetings. It is customary to inquire about the news regarding yesterday, today, family, work etc. when meeting an acquaintance. The "Habari-themes" were the central themes we wanted to follow upon over a period of time. This meant that in each village there were some 5 to 10 households whose "news" we were monitoring from the initialinterview onwards. These people were well aware that we were involved in research and we often discussed this with them.

The central method for PRA in Bura was networking. I have defined networking in Chapter 1 as dialogue that has been born within and between groups that have formed temporarily or permanently around a common problem. In the following section I willfocus on this method in the context of the case study.

### 4.3.1. Networking

Networking took place mainly at three levels: in the villages, with others involved in research and extension, and with administration at different levels. Through the

Figure 4.2. Participatory Research Approach in Bura 1985-1986




A = research office in Bura Centre
$B_n$ = a village where stove programme is in follow-up phase
$B_{n+1}$ = a village where stove programme is starting

1. During the first three weeks, 2-3 weekly visits are made by the research team from the office (A) to the village ($B_{n+1}$), during which discussions are held with community leaders and groups of villagers.
2.During the following four weeks daily visits are made for carrying out interviews with individuals and groups, as well as to start preparations for stove workshop.
3. Stove workshop is held. This includes an open village meeting and a visit by participants to a village ($B_n$) where stoves are in use.
4. 3-4 visits are made to village with emphasis on extension
5. The village is visited at least twice a week. The interviews are continued and "Habari" themes are added, a new village is approached ($B_{n+1}$)
6. Village $B_n$ receives visitors from village $B_{n+1}$ to see the new stoves
7. Weekly visits are made to monitor the stove programme and in order to identify new needs in the village

Note 1 & 2 in the diagram are simultaneous with 5, as are 2 and 3 respectively with 6 and 7.

dialogue within this network it was possible to incorporate different kinds of information and expertise into the research process.

Networking in the villages

In the villages a group of people (5-15) became a nucleus in motivating discussion and action among the rest of the villagers. Such discussions took place informally in small groups, or at stove workshops (attended by c. 20), or in village meetings attended by 20-70.

When SERP started, the initial approach in the first two or three villages varied slightly, but soon a procedure was established which was then carried out in all the other villages. This procedure involved the following steps:

1) introductory phase 2) stove workshop 3) follow up (Figure 4.2.). These are analyzed in the following paragraphs.

In the introductory phase the research team spent six weeks to two months in each village getting to know the villagers and the village. In practice this meant that the research assistant to whom the village had been assigned together with myself Figure carried out semistructured interviews, initiated and attended meetings with village chairmen, village committees and women's groups. In short, the time was used for mutual introduction. One of the aims of this introductory period was to identify the priority issues in each village. Firewood was always regarded as a major problem, but

seldom the most important one by the villagers. The priority problems varied from housing and crop failures to nutrition and health. (Table 4.1.)

One of the reasons for the meetings in the introductory phase was to determine who would be attending the stove workshop. The stove building became a central activity because it was seen as a partial solution to the fuel shortage, and it fitted easily within the forestry framework. On the other hand women building the stoves had control

Table 4.1. Priority Problems in Bura Irrigation and Settlement Scheme Villages, 1986-1987

| village | priority problems |
|---|---|
| 1 | - no water for vegetable plots<br>- poor harvests<br>- shortage of fuel |
| 2 | - lack of transport<br>- shortage and cost of fuel |
| 3 & 4 | - Bura centre is very far<br>- poor harvests<br>- no water for irrigation |
| 5 | - poor harvests<br>- no fuelwood |
| 6 | - houses in a poor condition<br>- bad health<br>- poor harvests |
| 7 & 9 | - no water to irrigate cotton<br>- no vegetable plots for everyone |
| 8 | - no water to irrigate |
| 10 | - shortage and cost of fuel<br>- school too far |

Source: interviews with tenants and discussions in village meetings

themselves over the materials needed and the procedure adopted (Chapter 7). The stove workshop took place over a week during which the first improved stove of the village was built. The people to attend were always chosen by villagers, usually on the basis of their ability to pass on the skill they would learn, and also according to

positions of influence and leadership. This procedure in itself was usually very enlightening about the decision-making processes in the village.

The only criterion set by the research team for participation was that the numbers should not exceed twenty (this limitwas necessary both because of the size of the houses and the Land Rover), and approximately half should be men and women. We found this to be necessary after an experience in one village were we had targeted the stove development solely at women, thinking that men would not even be interested in something so specifically belonging to the women's sphere. However, we found that even if this was true in the long term, in the short term women needed the approval of the men to carry out stove building as a group activity. So even if nominal, the participation of men was desirable.

Apart from becoming a tool in passing on stove building skills, the workshop functioned as a stage for networking in two other distinct ways. Firstly, in the process of building the stove there are two days in the week when nothing can be done to the stove. This is when the wet mixture of sand/clay/water/cowdung dries. One of these days was used for an open village meeting. This could be attended by anybody and usually took place in one of the village nurseries established by the Scheme forester. The forester usually took the opportunity to explain nursery establishment and tree planting, and was available for questions. This meeting was also an opportunity to discuss the priority issues in a larger forum. Usually relevant professional staff from the Scheme and the Districtadministration were invited to answer questions on issues outside the administration of the forester, for example home economists on

vegetable gardening (District) or irrigation officers on irrigation (Scheme). At times it was difficult to get the appropriate officer to attend the meeting, and it could be that other kinds of action were suggested by the meeting. On one occasion it was suggested that the research team should draft a letter to the Scheme Manager including questions tenants had about the poor condition of houses. It was seen that while this was not particularly difficultfor the researchers to do, similar action by an individual or a group of tenants might invoke censure by the Scheme administration. This is an example of a situation where SERP through PRA was able to provide a means of expressing the opinion of the villagers, where they were unable to do so before.

Secondly, the other free day was used for a visit by the workshop to a village where the stoves were already in use. This opened up possibilities for discussions between users and potential users of stoves, and in addition discussions on a wide range of issues concerning village development were also initiated. On the question of stoves it was obvious to all that whereas the people organizing the workshop (the research team) did have some technical knowledge on the stoves to combine with the tenants' knowledge of the materials used, none of the team was actually using the stoves. So even if we could answer questions on expected impact on firewood consumption we could not really know how differentlythe stove cooked "chapati" (a type of bread) from the open fire. When visiting a village where the new stoves were already in use those questions could be directed to real experts on the stove properties.

The villages are arranged in pairs and the distances between the pairs vary from

approximately two kilometres to over ten kilometres (Table 4.2.). There was no transport arranged for moving from one village to another, and the only way to visit another village was to walk or hitch hike. As group visits between the villages were previously unknown, the discussion was lively covering topics from comparison of crops to what kind of projects were being funded in the villages by the various organizations and ministries.

Table 4.2. Distances Between the Villages and Bura Centre

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | |
| 2 | 1.0 | | | | | | | | | |
| 3 | 7.0 | 7.0 | | | | km | | | | |
| 4 | 6.5 | 6.5 | 1.0 | | | | | | | |
| 5 | 6.5 | 6.5 | 4.5 | 4.5 | | | | | | |
| 6 | 6.5 | 6.5 | 4.5 | 4.5 | 1.0 | | | | | |
| 7 | 11.5 | 11.5 | 7.0 | 6.5 | 2.5 | 2.5 | | | | |
| 8 | 9.5 | 9.5 | 7.5 | 7.0 | 3.0 | 3.0 | 3.0 | | | |
| 9 | 12.5 | 13.5 | 9.0 | 9.5 | 4.5 | 4.5 | 2.0 | 4.0 | | |
| 10 | 10.0 | 10.5 | 10.5 | 10.0 | 7.0 | 7.0 | 2.0 | 4.0 | 1.0 | |
| Bura | 9.0 | 8.0 | 12.5 | 12.5 | 8.5 | 9.0 | 5.0 | 8.0 | 4.5 | 3.5 |
| vill | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |

Source: The distances are measured with a car meter driving from the village centres along the main roads

After the workshop the follow-up period of the stove programme would start. The research team was never directly involved in building the stoves in villages, but one of the assistants would always be present in case assistance was needed. The

building was organized by the villagers, and took place usually in groups of about five people. The group would together build the stoves for each household. Apart from the stove building the research assistant would continue to monitor changes in issues regarded as problems in the village (eg. by using the "Habari-themes" see Appendix 2). She would at times become the village's link with other parts of the administration.

Networking with research and extension

As a research team we also initiated fortnightly meetings between the women involved in extension work on the Scheme. These meetings were still continuing three years after the end of the research component in the field, as was confirmed during a visit to Bura in August 1987 and subsequent monthly reports of BFPP (BFPP, 1987 & 1988 & 1989). Apart from the research team the meetings involved the two or three Home Economists stationed in Bura by the Ministry of Agriculture, the Nutritionist from Ministry of Health, representatives from the American Maryknoll Sisters who had a mission house in two of the villages, and any women on the Scheme staff involved with work in the villages. (eg. during 1985-1987 this meant the officer in charge of crop research).

The need for these meetings was twofold. Firstly, they were to ensure to some extent that limited resources were not being wasted through unco-ordinated efforts resulting in overlapping, and more importantly to share the available resources, often in very practical terms such as transport. Even though there were Home Economists

in Bura specifically to do extension work, they did not have a fuel allocation from MoALDand thus were often immobile. Secondly, the research team benefitted from the regularly shared perceptions on the problems and possible solutions by professional women involved in extension. It was possible to raise discussion on issues of fuelwood, and to take part in a continuous dialogue on development of the women's situation in Bura.(see also Chapter 6)

Networking with administration

Networking with senior staff and administration (at Scheme, Local and Districtlevels) was by necessity more formal, and took place mainly at pre-arranged interviews and workshops. The Scheme Manager followed SERP's progress through intermittent interviews with myself. The district officers for development, forestry and social services were discussed with on our monthly visits to Hola, the district headquarters.

From the research point of view I regard a networking situation as participatory if all participants in the situation had some control over what took place. For example, in the stove workshop, apart from building one stove, the rest of the agenda was really up to those participating from the village. In the same way the agenda for meetings with the other extension staff was decided in each meeting on the basis of what everyone most wanted or needed to discuss.

It could be argued that networking in villages and with other extension staff was generally participatory, in terms of control over the dialogue. Networking with the

administration was largely non-participatory. The dialogue was often restricted by participants' expectations regarding information obtained, and fear of consequences resulting from something said.

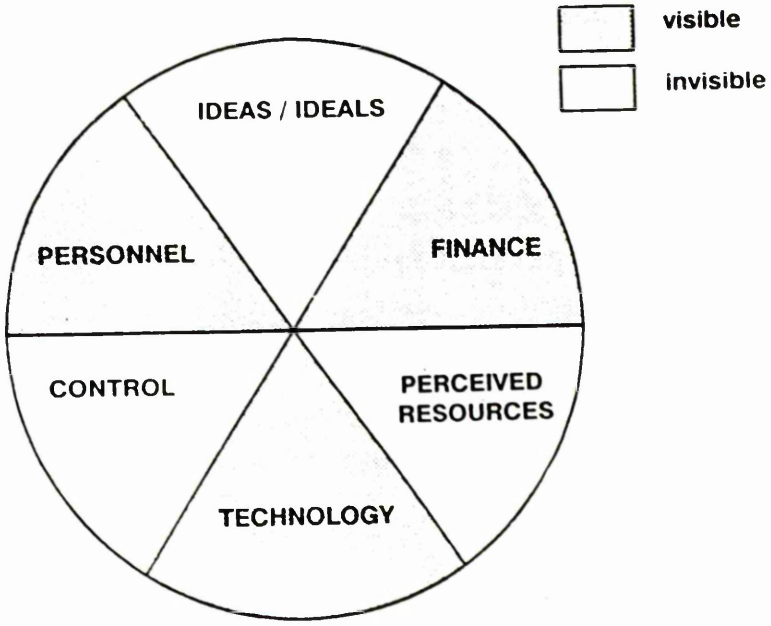
4.3.2. Relationship between aid and PRA

However aid is defined, I believe that it has certain features that are either visible or invisible to the recipient community (Figure 4.3.). If we evaluate aid from the receiver end, not at the national level but at the local and individual level, aid represents first of all Technical Assistance Personnel (TAP) present in the area. Finance is often a new resource but usually controlled either by TAP or, in any case, not at the local level. Another visible manifestation of aid is new technology, usually also controlled by TAP. These features, which I have called "visible", represent also those aspects of an aid programme which are negotiated over by the recipient and donor governments. They are defined and quantified, and can be found in the project documents. I have listed the visible features of BFPP in Table 8.1.

Other significant features of aid are, in my view, the aspects which are hard to quantify, and thus to negotiate over. I have called these the "invisible" aspects of aid. I have divided these aspects in three groups: ideas/ideals, perceived resources and control. Aid represents certain ideas or ideals about the development of the area or a structure. Among the interest groups involved (the recipient government and community, the donor government and the implementing agency/ies) these are seldom discussed and made explicit, but nevertheless are a strong motivation in carrying out a programme. As I will discuss later, the perception of what the resources

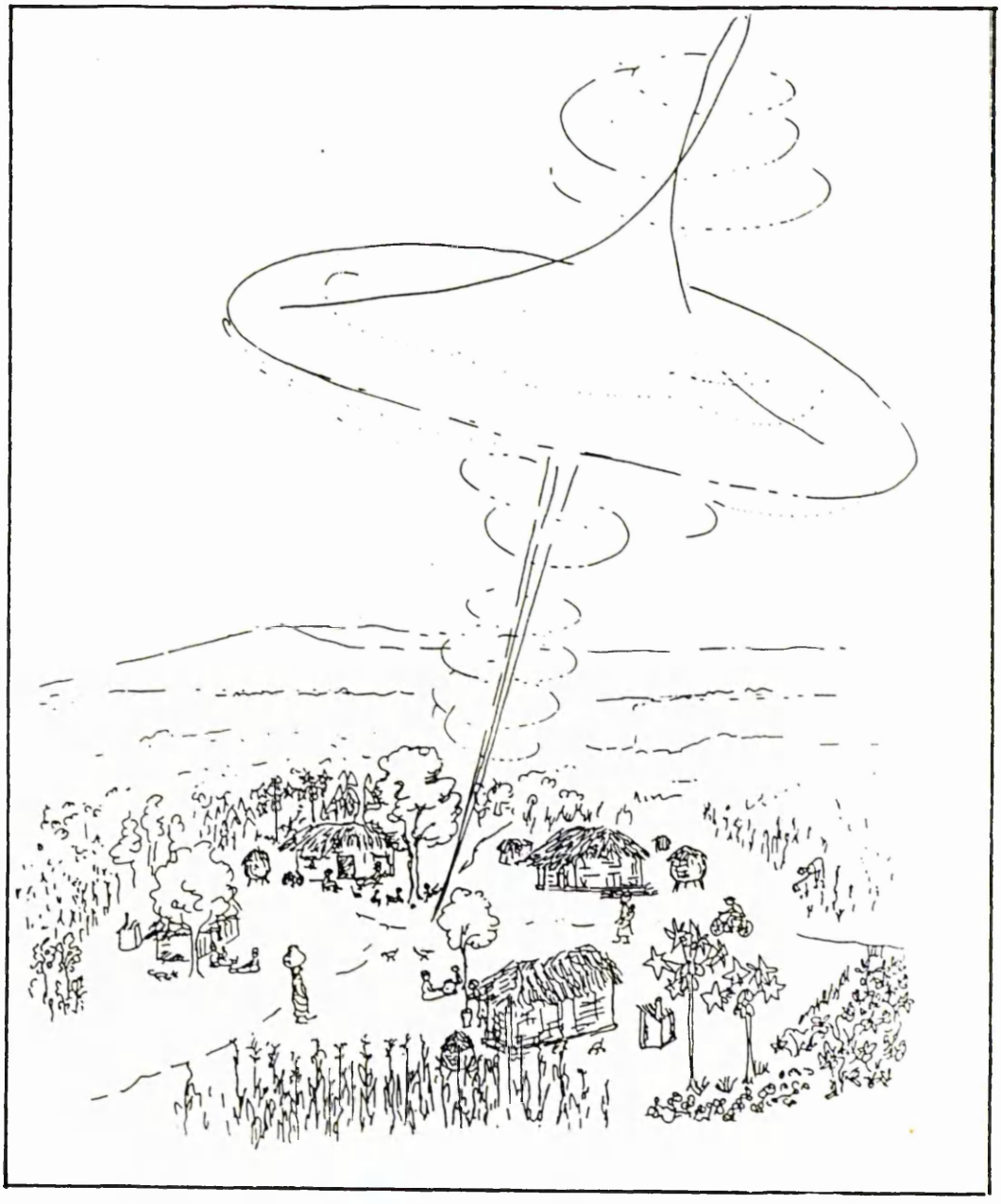
are have a strong impact on action and policy. For example, the recipient community is often thought of as a resource for an aid programme, although this is not agreed upon with the community in question. Finally, control over all existing and new resources is a question the importance of which is not acknowledged in aid agreements. One consequence of that is when the aid programme is the strongest administrative and operative unit in an area, it is easier to incorporate existing local resources in the aid programme, than to establish new resources introduced by aid in the local resource base.

Figure 4.3. Visible/Invisible Aspects of Aid as Perceived from Receiver Point of View




Source: Vainio-Mattilafor this thesis

Figure 4.4. Aid Causes Change



Development aid may have small impact in global terms, but locally the incoming personnel, technology and money will always cause change. (Figure drawn by Dr Taimi Sitari)

I would also argue that no such thing as "neutral" aid exists, but that all aid causes change (Figure 4.4.). A recent study in Finland (Swantz, 1989) on transfer of technology in development aid projects places such a process firmly in the socio-cultural context.

"No integrated technological development could take place if it did not link up with endogenous technology and knowledge."
(Swantz, 1989, pg 18)

SERP is a specific kind of participatory research in that it takes place within the framework of aid. Figure 4.5. is an attempt to apply the representation of aid in Figure 4.3. within the specific context of SERP, and to depict what components of SERP represent the different sectors of aid. In a participatory research process it could be expected that the visible features become resources for a participatory development process and that control of them is shared as all interest groups have equal opportunities to direct the process.

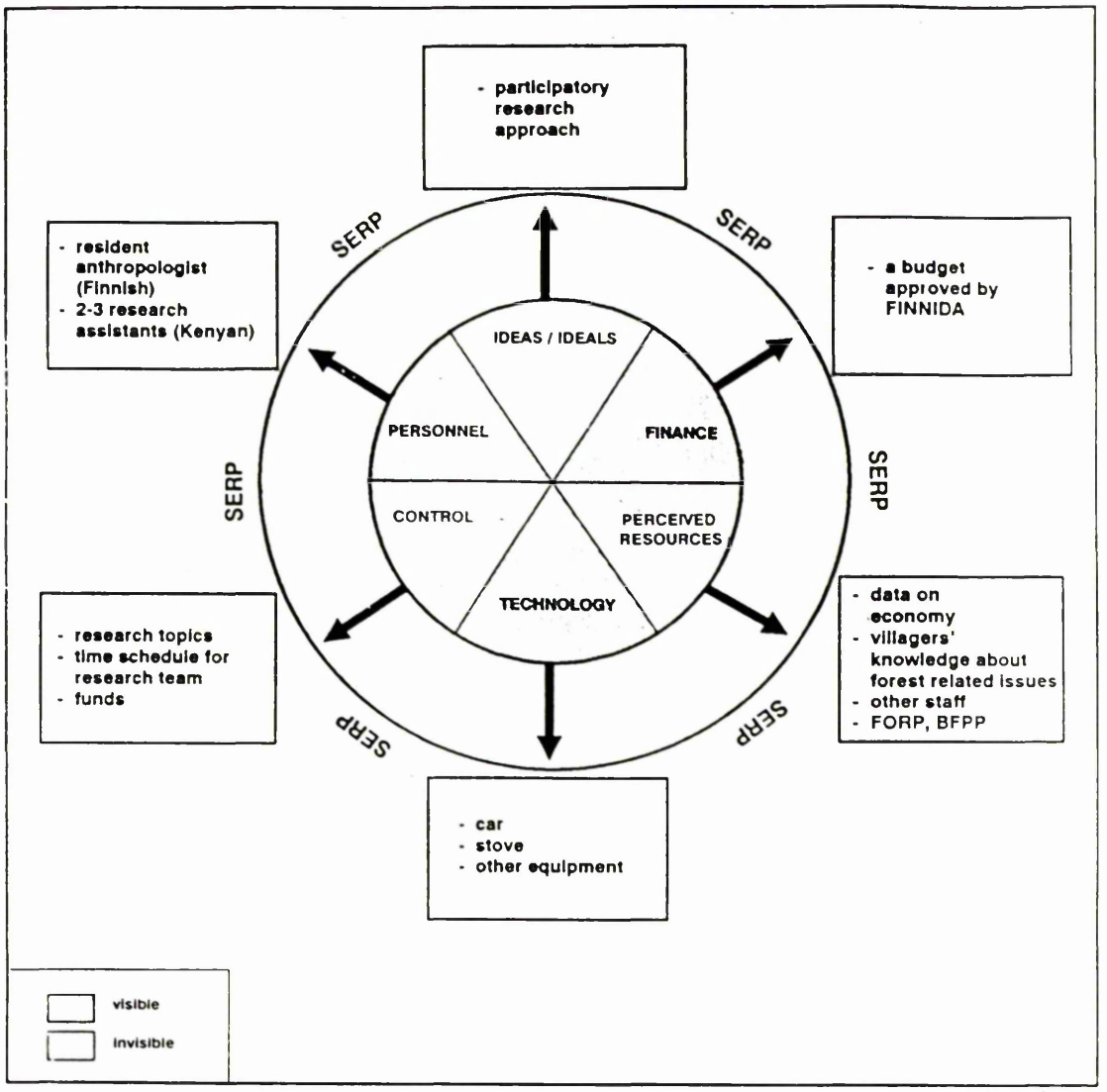
In the case of SERP the strongest control remained with the funder, in this case FINNIDA(Figure 4.6.). The only contact FINNIDAhad with the interest groups in Bura was through BFPP, and one of the purposes of funding SERP in the first place was to establish this contact. In the field situation, though, the control of FINNIDA's resources in practice was with each of the project components, and thus this was the case with SERP. In principle it seems that if SERP was a participatory process, participation was made possible within the framework of aid.

The funder's control was located in Finland. Although some of its resources were transferred to Kenya the distance effectively meant giving control to another institution. For this purpose the interests of the funder as a controller of a resource base were vested in an implementing agency. This implementing agency then incorporated the funder's resources, not necessarily its interests, into its own resource base, which existed both in Finland and Kenya. This can be argued for all the three components of the BFPP. Only visible features of the programme were negotiated between officers of donor and recipient countries; the other features were not. It is not possible to legislate for flows of ideas or ideals, for personalities of Technical Assistance Personnel (TAP)who may take more control than desirable over the use of new and old resources although this is usually attempted through various training programmes and institution building inputs.

The whole process was further complicated by the fact that the recipient community at the negotiation stage was still physically in a different place. Their resource base consisted of the same features but there is no process through which it would have been possible to incorporate the new resource base into the existing one in order to implement locally identifieddevelopment strategies. The opposite can happen, in that the community's resource base can be sucked into the development programme so that not only are the local strategies not implemented, but all the resources are used within a narrow sector.

As the research components, and especially SERP, were linkages between the funder and the recipients it is important to look at the impact SERP had through the process

Figure 4.5. Aid Resource Base Reflected in SERP




In Figure 4.5. the outer sectors represent examples of SERP components reflecting the sectors of aid resource base.

Source: Vainio-Mattilafor this thesis

of field work on the forestry programme. The main sphere of influence was clearly with the stove programme. It had been approved as a component by the planners from the beginning and although it rapidly grew beyond the original intent this was not objected to. My understanding of the situation is that the reasons for this growth were never fully comprehended. From the BFPP point of view the reason to build these stoves was their capacity to decrease the use of firewood. What was not undestood was the organization that built up among the villagers, that this programme was a means to empowering the villagers to take action on a problem solving strategy where they (the villagers) controlled the required resources. (Chapter 7)

4.4. Comparison of participatory approach and other research approaches in Bura

Previously there had been two socio-economic research programmes (de Leeuw, 1982; Ruigu et al, 1984) in Bura in addition to some shorter studies (Elmendorf, 1976; Bahemuka, 1983).

De Leuuw's (1982) study concentrated on the recruitment procedure of the tenant farmers and on aspects of early settlement in the area. He particularly noted the discrepancies between recorded criteria for tenant selection and the actual procedure of selection. He was very critical of the Scheme, its conceptualization and the practical arrangements for life in BISS. The main purpose of his study was "To gather information..." on various topics, as was reflected in his research aims. His concern was more with the academic achievement than with the possible effect his study could have in Bura. However rightly critical the study may have been, only a draft of

Figure 4.6. Control Over Aid Resource Base in Bura

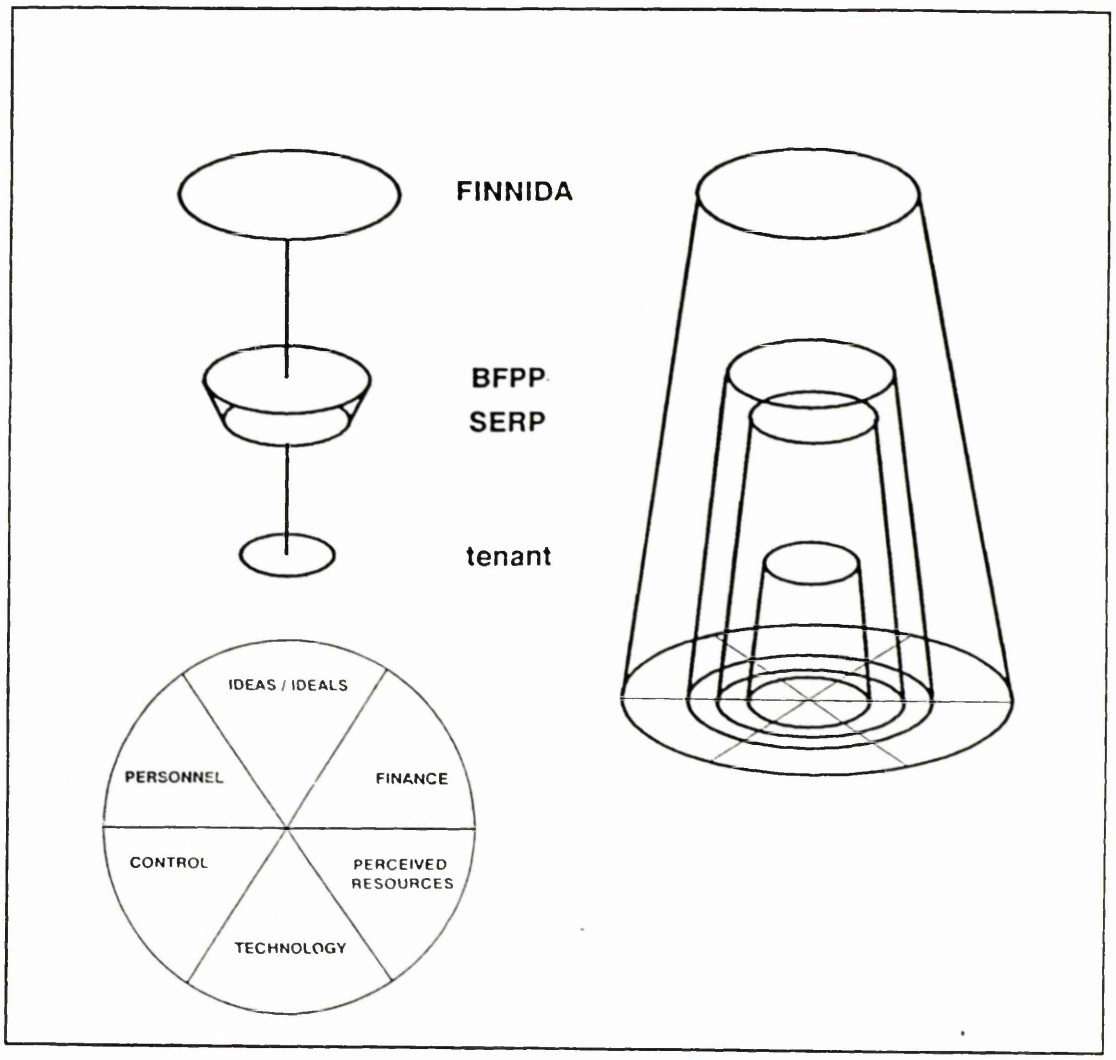



Figure 4.6. In aid programmes local control of resources is usually more limited that external control

Source: Vainio-Mattila for this thesis

it ever reached Bura. Even at the minimal level of making recommendations for discussion by various authorities it did not have any effect.

The second study (Ruigu et al, 1984) was a systematic survey of the socio-economics of the Scheme. It didn't touch the tenants in any other way except through the interviewing situation, but because it was carried out by an established national academic institution (Institute for Development Studies, Nairobi) it had the advantage of at least being read by many. As a survey it was successful in collecting organized quantitative data for use by planners.

As SERP also represented a co-operation effort between IDS Nairobi and Helsinki, IDS Nairobi carried out a new survey (Ruigu et al, 1987) in 1986 and 1987. This was on a smaller scale than the previous one, but was still highly structured. The survey took two weeks to conduct with the help of two research assistants and six interviewers. The research assistants were students from the University of Nairobi, while the interviewers were locally recruited among secondary school pupils on leave.

It is interesting to compare the results of the surveys with the results of the PRA. It can be safely said that the respondents had a very different experience with the two approaches. This was reflected in the eight cases where there was an overlap between interviews carried out as part of the survey and the contacts the research team had made in the villages. The survey's interest was particularly in household economics and the data were analyzed by economists, yet it was exactly on economic information that the discrepancies were most notable. For example, PRA information

on household income, debts, expenditures, and so on, were based on visits carried out repeatedly throughout the year and discussions on the "Habari"-themes, and could be checked against Scheme records and information on village economics generated and shared through the network. Meanwhile the survey data were based on a series of questions asked once only of one member of the household.

The results also looked very different. The survey results could be expressed in a tabulated form. This kind of presentation can be very useful in some circumstances, and it is not my intention to deride the value of quantitative data. My argument is that development aid makes a difference to the local community, and the way to gain an understanding of the local context of the aid is to, from the beginning, initiate participatory channels for information sharing. The result of this will be local empowerment firstly, to identify solutions and, secondly, to implement changes based on needs.

I was equally convinced at the end of my research period, as I was in the beginning, that participatory methodologies are appropriate field methodologies within the development aid context. It seems that the cornerstones of PRA; the validity of qualitative knowledge, the adaptability of research aims during the research period and subjective approach to interpreting social context are not ones on which "academic" research is easily built. I will not now start defending the approach by trying to quantify the results, but I would like to air some aspects of the research method which I would approach differently given an opportunity.

I would start by trying to identify more strongly different interest groups in the research area and their priorities regarding the development of the area. Due to the nature of a settlement scheme, and also because in the beginning I really had no experience of any research in the field, it was easy to be taken in by the apparent homogenieity of the tenant households.

Since the approach is based on close co-operation between the researcher and the local community all cultural skills such as language, experience in the area and knowledge of the problems, for example, are a definite strength, and lack of them a weakness. With PRA it is possible also to suffer from lack of skill in communicating with people from your own country, because at some stage, within the aid context you have to "take sides" and identify yourself with some interest group(s) more than others. For me that group was the women involved in the stove programme. This identification could have proved an obstacle in communication with the administration though I made every effort to ensure that it didn't. Suspicions were still aroused. Why were so many people gathering for a village meeting to build stoves? In Bura stove building became at times very much part of local politics, with the local MP and the Scheme Manager taking sides for and against it. This was not necessarily a bad thing in the long term, but becoming too strongly identified with one interest group does not mean that the others do not exist. An additional problem with PRA is that although it can be the means for empowerment, it can also be used by one interest group to gain more power (access to and control over resources) at the expense of another group.

It was a weakness too that the research co-operation between IDS Helsinki and IDS

Nairobi remained nominal. It would have been an opportunity for collating results of two different approaches. With hindsight it is clear that hard data would have been more convincing to the team implementing the forestry project than analysis based on such qualitative knowledge. The co-operation with the implementation component was never as strong as it should have been. SERP could have played a stronger role in bringing BFPP closer to the villagers. There was strong mutual suspicion of the approaches adopted that did not cultivate co-operation.

One short-coming from the point of view of carrying out baseline socio-economic research was the fact that through PRA I was very much part of the various aspects of village concerns, and as I was being a "communicator" on issues of housing, child health and so on, I did learn a great deal about village life in general, but it was easy to lose sight of the research problems given in the terms of reference for SERP.

As has been explained earlier, not all research techniques used in Bura were participatory in themselves. In fact, if we were to restrict research to only participatory techniques, such as networking, the research scope would be extremely narrow. By definition participatory research includes also the contribution of the researcher. This means that it would have been possible to use conventional research techniques in the identification of needs, resources and solutions in Bura to a larger extent than I did. However the thirteen months that I spent continuosly in Bura were too short a time to simultaneously carry out a more conventional research project and to begin to grasp at what participation of recipient communities in development aid could mean for development on the whole.

## 4.5. Conclusion

In this chapter I have described the process that took place within SERP. I have pointed out the different expectations directed at SERP in terms of results and impact both within participating institutions and in Bura.

PRA can function as a link, or a communicator between the project implementation and the recipient community. Sometimes we were able to initiatediscussion between institutions that would not normally have the opportunity for discussion, as in the case of two villages during the stove workshop. At other times discussions were held between groups who lacked the will (at least from one side) to discuss, as was the case between tenants and Scheme management.

When PR was elected as the approach for SERP the other interest groups did not know what kind of results could be expected of SERP. It remains a conflict, and a weakness, for PRA to determine what form should research results take. There is an understandable reluctance, which I share, to validate the qualitative results obtained through PRA with quantitative presentation. There is nothing in PRA as such which would be an obstacle to using quantitative methods, but it has been the experience shared by many in the field of development research, that unnecessary data are generated in vast quantities and never used. As an alternative to this PRA offers an approach through which research results are immediately put to use in their proper context; the community whose life they describe.

I have also discussed the constraints of aid on PRA and evaluated the

appropriateness of PRA in the case of Bura. This subject is focussed more on in the following chapters, as I focus on the forestry sector resources in Bura andlook at women as a specific interest group in Chapter 6 and discuss the impact of BFPP on the resources of BISS villagers in Chapter 8.

# 5. FARMERS' RESOURCES FOR FORESTRY IN BURA

## 5.1. Introduction

Forestry strategies have been developed in Bura as a response to an increasing shortage of woodfuels for households. This shortage was experienced by both the tenant and satellite population living in and around BISS. However, the role of these people in the development of forestry strategies has been minimal. In this Chapter I willfocus on the relationship between people most affected by shortage of domestic fuels (tenant farmers) and the forestry sector.

Firstly, I want to clarify what were the resources available to the households in Bura prior to the establishment of Bura Fuelwood Plantation Project for planning household level woodfuel strategies. These include resources such as land suitable for growing trees, alternative fuels (eg. agricultural residues) and storage space, which are all either provided for by the Scheme or stipulated on by the Irrigation Act. They also include resources less obviously controlled by the Scheme, such as credit available from the CLSMB for cotton, technology and labour. Secondly, I want to juxtapose these resources with the strategies introduced by the forestry project.

This discussion on the farmers' resources in the forestry sector helps to identify the Specific Interest Space later in the thesis. An understanding of these resources is vital to the analysis of what the impact of the forestry project in Bura was on the recipients' forestry related resources and for understanding what interests were held by the farmers for participating in forestry related activities.

## 5.2. Forestry related needs

The energy crisis in Bura was perceived in terms of lack of firewood as is reflected in the Scheme plans (Republic of Kenya,1977; Enso-Gutzeit,1986), thus the solutions have also been narrowly determined in terms of forestry. Since the time when the energy needs of the Scheme were first considered in the late 1970's, the approaches to energy needs generally have developed and diversified. The Project Planning Report (PPR) considered different options within the forestry framework, as well as substitute fuels; charcoal and paraffin. These were expected to substitute for firewood at a given rate (Republic of Kenya, 1977). All considered, long-term fuel supply alternatives were market-oriented conventional forestry solutions. (Table 5.5.)

From the point of view of a development project, the "forestry for fuelwood" approach has several merits. The aims of this kind of a project can be clearly defined in quantifiable terms. Its costs are based on a known structure of components, such as land, water, tools, seeds, seedlings and labour. The technology needed has been well tested and can be counted upon to produce the desired effect, that is, a certain yield in a set time-frame. The question remains, however, whether forestry is the solution to a domestic fuelwood shortage. Apart from firewood, the tenants in Bura use trees and wood for building furniture and extensions for their houses (mainly poles), for fencing their homestead in order to create privacy in the village, as shade to protect from sun and dust, as windbreaks around the house and the village, and for fruit production. Some tenants grow fruit-trees in their vegetable plots and kitchen gardens and fence these.

The household fuel shortage can be seen in terms of long term policy decisions and short term solutions in a situation where tenants are already facing acute shortages. The term used to describe the short-term aspect of the firewood scarcity is "fuelwood gap". By fuelwood gap I mean the period of time from when the natural forest cannot cope with demands placed on it, to the time when irrigated afforestation can provide the population with the needed fuel. Many of the documents assume that the fuelwood gap will be equal to the length of plantation rotation, which would mean the number of years to the first harvest. In the case of Prosopis julifloratthis has been estimated at 4-5 years. However, that will not be the end of the fuelwood gap, since the first harvests will not be able to meet the total demand as will be seen below. The fuelwood gap must be seen as a long-term aspect of the crisis.

## 5.3. Pre-BFPP forestry resources in Bura

In this part of the chapter the kinds of resources that the tenants and their families have a degree of control, or at least some choice, over are described. All resources are multipurpose, that is, they are never used within only one sector, and despite the emphasis here on the relationship of these resources and woodfuel shortage, it is not suggested that this is all they are used for.

### 5.3.1. Financial resources

The basis of the household economy in Bura is the monetary income the tenant earns from the cotton crop. This is supplemented mainly by the maize crop intended for subsistence, and to a lesser degree by produce from the vegetable plot.(Chapter 3)

Financially the year has distinct phases. Until the cotton harvest the household relies on the income from the previous harvest, which has been paid in principle during previous December. The cotton harvest starts in August/September, and during this time farmers receive 10% of the price of each kilo they pick. This money is paid to the tenant. (Figure 5.1.)

This means that during the six weeks of the harvest, the farmer has a fairly steady supply of money, with which he can cover his day-to-day expenses, including the hiring of labour. This is followed by a period, the length of which depends on the date of the final payout (usually 2 to 4 months), during which money is in short supply. This coincides with the period when the previous maize crop has been consumed, and the new one has not been harvested yet.

If the harvest has been successful, the money the farmer receives as the final instalment will see him through to the next cotton harvest. Naturally this is affected by the number and kind of monetary commitments the farmer has, for example school fees or supporting part of the family somewhere else other than in Bura.

The conclusion is that the year can be divided into two. The first part (usually 4 to 6 months) is that during which money is an available resource (Figure 5.1.). Debts are paid, visits made "back home", meat eaten and other luxuries such as beer and sodas consumed. The other part of the year is the time when various internal pressures increase: labour input is required for the agricultural work, money is less available and the food shortage increases until the maize harvest.

Figure 5.1. Financial Resources of a Farmer (Bura 1985)

```
Farmer's annual income based on:
- a yield of 2 500 kg/ha = 3 125kg/1.25 ha(=1plot)
- price of cotton paid to farmer 5 KSH/kg (1985)
- picking of cotton at the rate of 1.5% of total
  harvest each day during peak harvesting season
  (= 50 days)
                          was in TOTAL 15 625.00 KSH

Production costs incurred by farmer:
- 5 bags of fertilizer per crop @ 141.50 KSH= 2 112.50
- watercharges 1000 KSH/crop                = 3 000.00
- aerial spray (for two plot of cotton only)= 4 000.00

                                   TOTAL  9 122.50 KSH

FARMERS NET INCOME (1985) WAS IN TOTAL  6 202.00 KSH
```

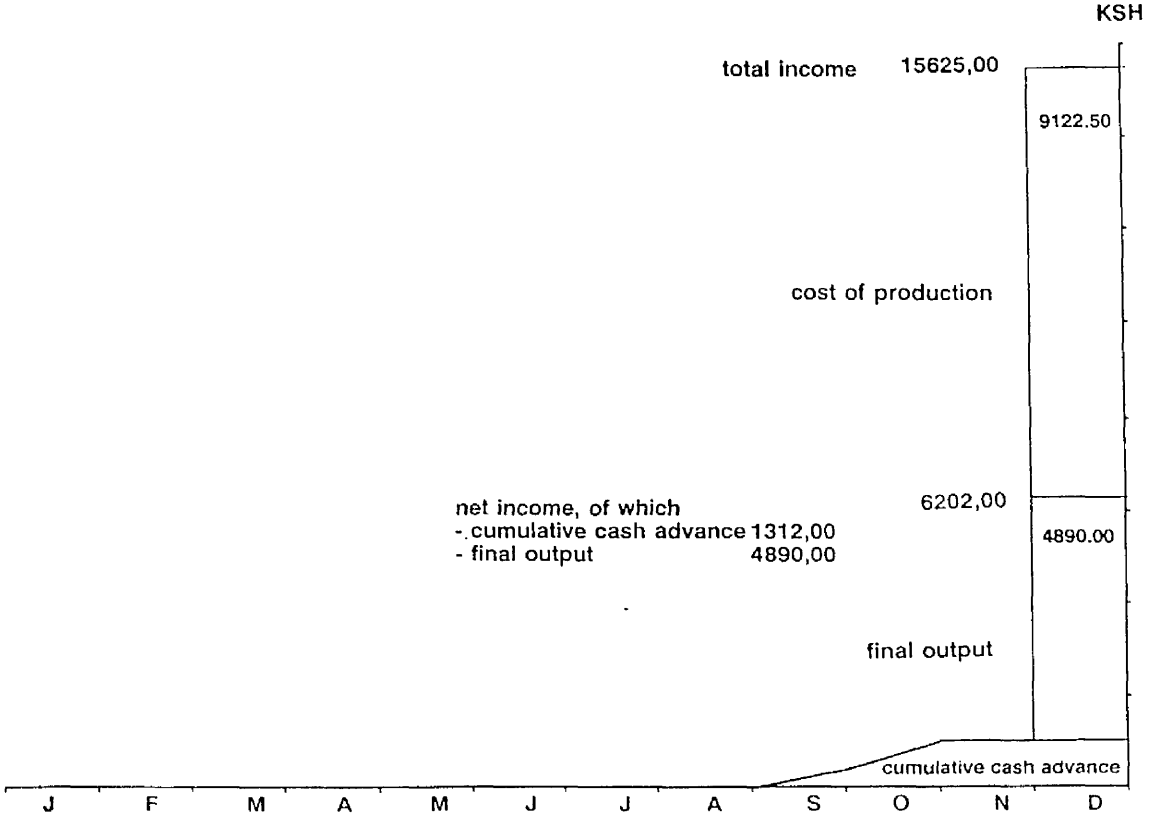



Figure 5.1. shows the distribution of farmer's cash income over a year. During January to August farmer relies on the finalpay out from previous year. From the beginning of the cotton harvesting farmer begins to receive cash advances based on the harvest.

NOTEThe net income here represents cash received during the year 1985 by a farmer achieving expected yields. According to the annual report of 1984/85 of BISS actual payments to farmers varied from average of 3 791 KSH in villages 1,2,3,4,5 and 6, to 7 942 KSH in 7,8 and 9.

Source: Vainio-Mattilafor this thesis

Women's input for the production system in Bura is not recognized by the method of payment. In the PPR (Republic of Kenya, 1977) it was suggested that the female head of the household should be paid some of the income directly. In reality it has now become even more difficult for women to have direct control over the finances, as from 1987 onwards money has been paid into a bank account due to the administrations increased fears of robbery. The bank accounts have been opened in the name of the tenant, who in 82% of the Scheme households is the male head (according to BISS Settlement Office Records).

A trend that has appeared strongly with the woodfuel shortage is that the proportion of bought woodfuels in domestic use has increased at the expense of collected woodfuels. This would seem to mean that at times when money is available it is used to supplement "free" fuel sources. As money is available to women through the men, this also means that to an increasing extent women are becoming dependent on men for the fulfilmentof their role as providers of fuel, assigned to them within society.

As a basis for calculating the proportion of the income spent on purchasing domestic fuel, I used the Annual Report of 1984/1985 (National Irrigation Board, 1985) according to which an average farmer would earn a net income of 5884 Shs. In Table 5.1. below the proportion of fuel expenditure out of the total income is shown.

The other main categories of household expenditure are labour, food, clothes and school fees. The proportion spent on these out of the total expenditure varies very much according to the priorities of the particular household; on the other hand the

fuel expenditure per household does not vary much between the different households.

5.3.2. Choice of technology

The stoves used and the stove programme which was established during the research period within BFPP is described in Chapter 7. Here it is important to note that through choosing a different technology within their means, women were able to contribute towards easing the immediate daily fuel shortage they were facing. Otherwise tenants' access to technology for dealing with domestic energy was limited. New means of transport were sought as distances for fuel collection became longer (5.3.6.)

5.3.3. Choice of fuels

In order to fully appreciate the possible fluctuations in fuelwood consumption in Bura, it is necessary to understand the factors which determine the choices made concerning domestic energy.

Maybe the most obvious aspect of consumption fluctuation in Bura is its seasonality as determined by, on one hand, the agricultural cycle, and on the other, the financial cycle of the year. During the harvest period, firewood is bought to a larger extent in order to maximize the utilization of household labour in the agricultural work. This is made possible by the cotton picking advance, which provides the monetary resource for purchasing. The maize growing period is when fuel purchasing declines due to shortage of money and the opportunity exists for releasing household labour for firewood collection. At least if the final payout is delayed beyond the maize harvest,

Table 5.1. Fuel Cash Expenditure as Proportion of Average Total Cash Income

| VILL. | SPENT/MONTH/ HOUSEHOLD | SPENT/YEAR/ HOUSEHOLD | % OF 5884 SH * |
|---|---|---|---|
| 1 | 72.70 sh | 872.40 sh | 14.82% |
| 2 | 104.00 sh | 1248.00 sh | 21.21% |
| 3 | 65.77 sh | 789.24 sh | 13.41% |
| 4 | 76.79 sh | 921.48 sh | 15.66% |
| 5 | 89.23 sh | 1070.76 sh | 18.20% |
| 6 | 96.25 sh | 1155.00 sh | 19.62% |
| 7 | 82.67 sh | 992.04 sh | 16.86% |
| 8 | 107.40 sh | 1288.80 sh | 21.90% |
| 9 | 97.78 sh | 1173.36 sh | 19.94% |
| 10 | 82.50 sh | 990.00 sh | 16.82% |
| AVERAGE | | | 17.84% |

* average net income of a tenant according to the Annual Report of 1984/1985 (National Irrigation Board,1985)

Source: interviews in the villages

maize cobs are used to supplement firewood. The financial situation of a household also has a bearing on the kind and amount of food consumed.

The patterns of consumption with regard to the kinds of fuels used are defined by the choice available. As already discussed, choices for tenants were limited. For senior staff on the Scheme the choices were wider, and the availabilityof electricity meant that most opt for it in cooking. And if electricity was regarded as unreliable because of occasional power cuts, they were able to obtain gas. Woodfuels were mainly used for special cooking requiring barbecuing.

An interesting pattern in fuel consumption is displayed by the junior staff (Table 5.2.). The staff living at the Bura Building Force (BBF) compound were mainly unskilled casuals and the compound was a temporary place to live in as it would eventually be pulled down. In the Type G and F houses lived mostly skilled casuals, and the houses were meant for the Scheme staff. Those living in Type F were more senior than those living in Type G and as a rule they also earned more. The Police and Administrative Police (AP) compounds are included for comparison as representing groups with a steady source of income and a permanent residence while in Bura. The Police did in general earn a higher income than the Administrative Police.

The trends that can be read from Table 5.2. may reflect trends in consumption patterns at a more general level, too. The kind of fuel used is dependent on the financial status of the decision-maker, and so firewood was used less by those who earn more, and charcoal was preferred.

The other trend is that those at the lower end of the financial scale and those at the higher end are similarly constrained with seemingly fewer choices. The less affluent must, to a large degree, rely on the "free" sources of fuel: firewood and maize cobs. On the other hand, those with a higher income seemed to have a tacit consensus on which fuel is the "easiest" one. The staff in the middle income category "kept their options" open and made their decision in accordance with fuel availability and cost.

### 5.3.4. Labour

Labour available for work in Bura falls roughly into two categories. There are the

Table 5.2. Junior Staff Fuel Consumption Patterns by Housing-types

| FUEL USE | BBF | TYPE G | TYPE F | POLICE | AP |
|---|---|---|---|---|---|
| charcoal | 67% | 86% | 88% | 100% | 86% |
| paraffin | 22% | 50% | 63% | 89% | 43% |
| firewood | 34% | 22% | 9% | -- | 29% |
| maize cobs | 12% | 19% | 3% | -- | -- |
| gas | -- | -- | 6% | -- | -- |
| COMBINATIONS OF FUELS USED | BBF | G | F | POLICE | AP |
| charcoal (c) | 33.3% | 25.0% | 25.0% | 11.0% | 28.6% |
| paraffin (p) | -- | 2.7% | 6.3% | -- | -- |
| firewood (f) | 27.7% | 5.6% | 3.1% | -- | 14.3% |
| maize cobs (m) | 5.6% | -- | -- | -- | -- |
| gas (g) | -- | -- | -- | -- | -- |
| c & p | 22.2% | 38.9% | 50.0% | 89.0% | 42.8% |
| c & m | 5.6% | 5.6% | 3.1% | -- | -- |
| c & f | 5.6% | 5.6% | 6.3% | -- | 14.3% |
| m & p | -- | 2.7% | -- | -- | -- |
| g & p | -- | -- | 3.1% | -- | -- |
| c & f & m | -- | 5.6% | -- | -- | -- |
| c & f & p | -- | 8.3% | -- | -- | -- |
| g & p & c | -- | -- | 3.1% | -- | -- |
| | 100 | 100 | 100 | 100 | 100 |

Source: interviews with junior staff

tenants and the non-tenant satellite population. Here the labour opportunities and demands are discussed.

The non-tenants that are employed on the Scheme either by the management (including constructors and consultants) or by the tenants, are employed largely on casual basis. They can be generally classified into one of the following groups:

1) Members of the tenants' families whose labour input is temporarily or permanently superfluous.

2)People who have come to Bura specifically to seek business and employment opportunities.

3)People who have come to Bura seeking to settle there, but have not been allocated a tenancy yet.

4) Members of the families from the riverine villages who contribute to the household economy through earning cash income on the Scheme.

Of special interest for the Forestry Project is the so- called "Food for Work" programme. This programme has enabled the forestry department to start and maintain the village nurseries, as well as to carry out basic forestry tasks in the trial areas, such as planting, weeding and pruning. It is also noteworthy that many women are employed through this programme. The critics of these kinds of programmes generally agree that they tend to increase dependency on aid, as they do not make possible any choice of alternative investment opportunities. (Hayter, 1985; O'Neill, 1986)

Especially the numbers of those in categories 2 and 4 above fluctuate according to the opportunities. It seems that there are no constraints to getting labour on casual basis, as the numbers grow with the opportunities. This should, however, be considered carefully, as it does have a bearing on the tenant involvement in forestry in Bura.

As already quoted in chapter 3, one of the criteria for a farmer to be chosen as a tenant on the Scheme is that he is able to, from within his family, provide four Adult Labour Units (ALU).The basis for calculating these units is that an adult is one unit, and children under 16 are half a unit. In Figure 5.3. are the average numbers of Adult Labour Units (ALU) per family in BISS villages based on interviews. For discussion, also ALU's excluding children under 16 and the drop in percentage are expressed.

Before discussing in detail the implications of Table 5.3., I would like to discuss the labour actually needed to perform the agricultural tasks expected from the farmer.

The busiest times for the farmers are the cotton planting and harvesting. According to the Agricultural Research Department, a farmer needs to harvest 1.5% of his total harvest every day during the peak season, which they consider to be 50 days long. If we assume the harvest to be 2 600 kg/ha in the peak season, it would mean picking 50 kg a day. In Hola (a pilot scheme for Bura) it has been estimated that a person can pick three kg in an hour. In a six-day week (7 hours/day) a person can harvest 126 kg. For harvesting alone, then, 2.3 ALUs are needed. Additional labour requirements for carrying, grading and selling mean that a farmer needs 3.5-4 labour units in the peak season for cotton production [1].

It should be taken into consideration that at any given time there will also be the daily

[1] Source for these figures is verbal communication with the Agricultural Research Department

household chores,for example tending the children, managing the vegetable plot, and collecting fuel. Also a considerable factor is the walking distance to the "shamba" (sw. for field) which can vary between 300 metres and 3 km (de Leeuw, 1982). This means that many tenants (40% according to de Leeuw, 1982, 72.2% according to

Figure 5.3. Household Sizes Expressed in Adult Labour Units

| VILLAGE | ALU | ALU excl. children under 16 years | DROP IN % |
|---|---|---|---|
| 1 | 5.1 | 3.7 | 27.5% |
| 2 | 5.3 | 3.0 | 43.4% |
| 3 | 4.4 | 2.4 | 45.5% |
| 4 | 4.0 | 2.3 | 42.5% |
| 5 | 4.0 | 2.3 | 42.5% |
| 6 | 5.5 | 3.5 | 36.4% |
| 7 | 4.2 | 2.6 | 38.1% |
| 8 | 5.2 | 3.0 | 42.3% |
| 9 | 5.3 | 3.6 | 32.1% |
| 10 | 3.8 | 2.6 | 31.6% |

Source: interviews in the villages

IDS Nairobi, 1984) hire labour on a temporary basis. These figures are high in the light of the fact that the holdings were intended to be manageable within the household, and they reflect the falseness of that assumption.

One consequence of this is the involvement of children in the farm work. Children perform light agricultural tasks, and many of the household tasks such as child minding, firewood collection and stove minding. That there are times of the year when children are especially required for these tasks, is evidenced by the seasonal school

absenteeism acknowledged by the headmasters of all the primary schools in Bura (interviews at schools in Villages 1,4 and 7).

### 5.3.5. Land

The tenants' access to land is strictly controlled by the Scheme. The control is enforced by two mechanisms. Firstly, land is allocated annually to the tenants. They are allocated two plots for cotton and maize (0.625 ha each) and one plot for vegetable gardening (0.05 ha). These plots are reallocated each year, although there is some talk that the plots could be made permanent in order to entice the tenant farmers to invest in the development of their plots[2].

Secondly, all the agricultural inputs are regulated. The most important of these is water for irrigation. The infrastructure of an irrigation scheme makes it in effect impossible to expand agricultural production beyond it. The other agricultural inputs for which the tenant is dependent on the scheme are seeds and pesticides.

For growing trees the only land available on a household basis is the area immediately around the house. The size of this varies but is roughly 5x15 m. As one fixture of this area is the piped water supply, it is very popular for vegetable growing. Tenants generally would claim that water supply to the actual vegetable plots is not adequate.

[2] Some permanent plots have been allocated since 1988

5.3.6. Storage and transportation of fuel

Firewood is obtained for the household through using the following modes:

1) It is carried by the women on their heads or backs.
2) It is carried by men using bicycles or wheel-barrows.
3) It is brought into the village on a donkey, with or without a cart, by a fuelwood dealer who is either a resident or a non-resident of the village.
4) It is brought to villages on trucks hired by tenants to do a detour through their village.

As the firewood sources are depleted it has become increasingly difficultfor women to manage firewood collection by walking. In the riverine villages, firewood is collected daily, but at a very short distance (within half a kilometre from the village), so it is not excessively time-consuming. For the Scheme women, collecting firewood may mean a whole working day spent at it. Slowly, the men are taking over the responsibility for firewood collection when they have access to a means of transport. This trend was predictable also on the basis of experience in Hola, where firewood collection is now done mostly by boys on bicycles.

Each village is supplied by 3-5 donkey owners from outside the village, who "regularly" attend to the firewood needs in a particular village. These donkey owners are mostly Orma and Somali who are mobile in the vicinity of the Scheme. Also, in each village there are 1-2 donkey and cart owners. These are fuelwood dealers who can afford to hire labour to go with the donkey into the riverine area and return with

a cartload (Ruigu et al, 1988).

The Scheme has been trying to encourage farmers to train donkeys and buy donkey harnesses and carts, for example through demonstration at the agricultural show. In addition to this, the agricultural research station has studied the possibility of donkey training.

The donkey training programme was conceived upon the idea that

"transport based on donkey-pulled carts (is) the most appropriate both technically and economically from the tenant's standpoint"
(Mwatha, 1983, pg 5)

This mode of transport could be used for carrying - in addition to fuelwood - maize and cotton from the fields, and seeds and fertilizerto the fields. A trial programme was carried out, during which two donkeys were trained. Donkeys were perceived to have many advantages over the expensive and inaccessible lorries. For example, donkeys do not need oil or spare parts, they are drought and disease resistant and the carts can be made and maintained by the carpenters in Bura (Mwatha, 1983). However,

"The greatest difficultyone encounters when trying to use donkeys for work regards getting the animal to do what one wants."
(Mwatha, 1983, pg 6)

The perception of donkeys as an untapped resource for local transport is based on observation of the seemingly idle herds of donkeys in the Scheme area. It was estimated that there are approximately 5 000 donkeys milling about. However, it was not taken into consideration that the donkeys are in fact owned by the nomadic peoples.

The cost of a donkey-drawn cart was in 1983 estimated at 1 200 Shs, and a donkey can cost from 600 Shs upwards. At this price it would be accessible to the farmers in the long term, although much more training and information is needed. The idea of ownership by self- help groups, women's groups or farmers' committees has also been explored.

Firewood, as well as the other domestic fuels, is collected and bought on an individual basis per household. There is no communal planning or organization beyond the fact that women may go collecting as a group, especially if they go into the riverine area. There is also no communal storage of fuels. On one hand there are no facilities, and on the other, nowhere in Kenya is household fuel a communal affair.

Large loads of fuelwood, such as donkey cart loads, are bought seldom, only as financial resources allow it. Usually the fuelwood bought or collected will only be enough for one to three days. However, most households prefer to have a small store of fuelwood which is not used until there is no way of supplementing it.

Firewood is mostly stored either on the roof, or in between the two blocks of a house, depending on the house type. If a large quantity is bought, for example a cartload, which could be approximately one cubic metre of stacked wood, it is stored around the house. The idea that firewood would ever have been stolen was never mentioned as such, although those who had opportunity to store wood on the roof did so, saying it was safer there from thieves. Most usually the quantity stored was enough for two to three days.

Towards the end of the research period, the research assistants increasingly met with households with no firewood stored. This reflects the increasing difficulty in securing enough firewood when pressures from agricultural work are high. Land preparation and planting started before the farmers received the final instalment of their 1985 income in April1986. This meant a prolonged period of hardship, when financial difficulties were added to by insufficient labour to do both agricultural and household work.

When the storage question was discussed during, for example, the stove workshops, the general consensus was that each household should be able to remain in control of the fuel they use, including its storage. It was agreed that it would be impossible to design a "fair"system for storage of fuel. Also, it was thought that as long as there was fuel at all, each tenant was able to store a donkey cart load around the house.

## 5.4. Bura Fuelwood Plantation Project

Fuelwood has been referred to as the forgotten dimension of irrigation planning

(Hughes, 1984). Irrigation development in Bura has meant concentration of population into villages to allow for the agricultural production to take place on rectangular, canal surrounded fields. Construction of irrigation infrastructure has also meant clearing large areas of bush and so depleting available fuelwood resources.

By the time BISS was being planned, it seems that some lessons should have been learned from the West African experiences (Bird, 1983; Seeley et al, 1988). In the case of Bura the problem was not so much that woodfuel shortage was not foreseen and its potential gravity appreciated (Hughes, 1984), but that the shortage was, as it still commonly is, conceptualized exclusively from the forestry point of view. Exclusive, in that the users were not involved in the planning of afforestation strategies.

5.4.1. Development of BFPP

In the Project Planning Report, six alternatives for long- term household fuel supply were considered (Table 5.5.) Itwas strongly recommended that the possibility of using the riverine forest be rejected due to ecological considerations. The other alternatives were unirrigated plantations located to the south of Garsen (some 150 km from Bura), irrigated plantations adjacent to the agricultural area in the Bura Scheme, natural forests to the south-east of the project area (also some 150 km from Bura), charcoal and, finally, fossil fuels such as paraffin. In Table 5.5. are charted the costs of units equivalent to the thermal energy produced by 1 m3 of wood.

The option of irrigated plantations in Bura was recommended as the least costly

method for meeting the fuelwood demand on the Scheme.

The Bura Fuelwood Plantation Project (BFPP) was selected to be a part of the Technical Co-operation Programme between Kenya and Finland during the Annual Programme Consultations (APC) held in Nairobi in November 1981. This was the result of an earlier visit to the area by a team of Finnish energy experts. It was felt at the time that the project was very urgent, as the fuelwood situation in Bura was deteriorating rapidly, and so in May 1982 a FINNIDA (Finnish International Development Agency) mission was sent to Kenya to prepare an implementation plan. However, due to financial and managerial difficultiesthe scope of the whole Irrigation Scheme was modified (see Chapter 3). The establishment targets for irrigated forest plantations were reduced from 6 700 ha to 3 900 ha. At the same time, the population that the Fuelwood Project was supposed to cater for was estimated to drop from 65 000 (including the tenants and the satellite population) to 30 000. Based on these modifications the BFPP was also adjusted accordingly. It was decided that only 2 500 ha of forest would be planted between 1984 and 1986, and a decision on possible expansion to the original 4 500 ha would be taken later. In order to make the necessary adjustments a second FINNIDAmission visited Kenya in January 1984.

By the time the World Bank was carrying out its Midterm Evaluation at the end of 1984, no plantation project had yet got off the ground. FINNIDAassigned a consultant to participate in the World Bank/Cofinancing Project Midterm Evaluation Mission, with the specific task of determining how the short-term fuelwood and pole

Table 5.5. Costs of Alternatives for Long-term Fuel Supply

| OPTION | COST |
|---|---|
| 1. unirrigated plantations south of Garsen | 140 sh/m3 |
| 2. irrigated plantations in Bura | 105 sh/m3 |
| 3. natural forest in the south-east area | 119 sh/m3 |
| 4. charcoal | 207 sh/m3 |
| 5. fossil fuels | 318 sh/m3 |

Source: Republic of Kenya, 1977

supply for the Irrigation Scheme could best be organized. The most important result of this was the shift in focus from a fixed hectarage of forest to:

"a largely institution-building/development oriented project aiming at the provision of adequate fuelwood to the population of the Bura Scheme."
(FINNIDA,1984)

This shift was confirmed when the third FINNIDA mission took place in November 1984 in order to prepare a revised project document for implementation, appraising existing documentation against available information and the findings of the World Bank evaluation.

It should be noted though that despite a shift towards a more development oriented project, the conceptualization of the project aim still rests on the assumption that

growing trees is a solution to woodfuel shortage.

5.4.2. Aims of BFPP

As already indicated the scope of BFPP was changed several times in order to accommodate the revisions taking place regarding the scope of the Scheme. However, the approach to forestry was not changed and the plans concentrated on irrigated forestry. The overall development objective of BFPP was:

"to ensure self-sufficiency in fuel production within the Bura Settlement Scheme. By the end of the project the Scheme willhave all the financial and physical resources as well as adequate organization and other ways and means to produce and distribute fuel, so that supply meets demand."
(Enso-Gutzeit, 1985b, pg 3)

It was proposed that the Project would be carried out in two phases. For the implementation component the objectives for Phase I, which was to last two years were:

"- Fuelwood and construction wood plantation have been established on 600 hectares of irrigated areas and on rainfed areas on a pilot scale.
- Alternativefuel sources have been identified and their accessibility defined, and they shall be utilized to the extent possible.
- The procurement and distribution systems have been developed.
- Cost structure of fuel has been determined.

- An operating nursery capable of producing sufficient amount of seedlings has been erected"

(Enso-Gutzeit, 1985b, pg 4)

The first phase of BFPP came officially to an end at the end of 1987. The development objective for the second phase already expresses a wider concern and a more domestic fuel oriented approach. It is to:

"ensure sustained self-sufficiency in fuel production within the Bura Settlement Scheme and its immediate vicinity by the year 2000. By the end of the project the Scheme will have all the financial and physical resources as well as adequate organization and other ways and means to produce and distribute fuel, so that it is within the economical reach of the population at such a level that supply meets demand.

At the same time the project is to provide an environmentally satisfactory cover of protective woody vegetation, on a sustainable basis, and without reducing the value of crop production."

(Enso-Gutzeit, 1987, pg 16)

In terms of fuelwood the aim is that by the end of Phase II (the plan is for four years) 80% of fuelwood demand will be met from the plantation.

At the national level in Kenya deforestation is seen as a result of rapid population

growth, shortage of arable land and shortage of employment opportunities in the industrial and service sectors. In response to the threat to the forests and dangers of soil erosion, the Kenyan government has designed a three part strategy: preservation of indigenous forests, forest plantation programme and rural afforestation programme (Lusigi, 1982).

The Bura Fuelwood Plantation Project adopted a similar approach. The conservation of the riverine forest was seen as vital to long-term ecological balance in the area as well as being the main source of all forest related products. The main focus of the project was the plantation of Prosopis juliflora as fuelwood provision for the tenants. This plantation consists of mainly irrigated forestry undertaken with high technology. As it was obvious that the tenants' participation in the actual fuelwood plantation would be minimal, due to the training needed to use tools and learn plantation techniques, it was expected that they would participate in village afforestation. This involved the establishment of village nurseries from where seedlings were provided for fences, windbreaks and decoration.

The question is: to what are these strategies responding? From an outsider's view, they deal directly with the environmental deterioration, by protecting and increasing the natural resources available and they are also dealing with the household fuel shortage. From the villagers' point of view the protection of the riverine forest near the Scheme has meant increases in fuel prices as the fuelwood dealers have to collect it further away and they increasingly need to use more expensive means of transport.

The fuelwood plantation is not yet contributing to the fuel situation in Bura as the plantation was only started in 1986, and the first harvest is not expected before 1992. Some problems can already be predicted, however . As the plantations are geographically removed from the villages, transport will have to be organized for it. Prosopis julifloris so thorny that even the foresters are beginning to think that the only way it can be used in households is as charcoal. Also no harvest will cater for the whole scheme for many years to come, which means that the distribution of these resources will be based on who can afford to buy the fuelwood, rather than on who needs it most. And, most of all, who can afford the fuel produced by irrigated forestry when all the above factors will be contributing to the high price? Unless the fuel is significantly subsidised, or there is a dramatic increase in the tenants' incomes, the fuelwood plantation will not in any way reduce the household fuel shortage.

The village afforestation (shelterbelts, fences, windbreaks etc.) was never intended to produce fuelwood, but to increase the tenants awareness of the environmental issues. With the only common denominator between the village nurseries and the villages being their physical proximity, it comes as no big suprise that the tenants participation has not been as eager as originally expected. It is clear that the tree planting in the villages is not a function of awareness, but a function of the carefully balanced use of resources. Until September 1985 all villages relied on a common source of water for a pair of villages, and the villages remained bare. When water became available on a household basis (September 1985), trees were planted to transform the villages in a matter of weeks. Tree planting only makes sense if the reward from it makes the effort in terms of labour and time spent on it worthwhile. In

the case of Bura this reward was never going to be financial but protection from wind and sun.

The stove programme (see Chapter 7) became the focus of action and a window for the research team through which other household fuel economy issues were approached. From the beginning of the research and consequent stove development it was clear that the improved stoves were not the only problem solving strategy already in use, or talked about, in the villages. Another was, for example, supplementing firewood with agricultural residues. And on the other hand it was equally clear, that the fuel crisis was not the only reason for the stoves' popularity. In the villages there was no difficultyin perceiving the linkages between, for example, nutrition, child safety, women's workloads and the stoves. However, the inflexibility of planning and administration of large-scale forestry projects, primarily interested in fuelwood production, means that reflecting these linkages in project implementation is difficult. From the project point of view the stoves became a priority issue in the socio-economic research because they were seen as directly responding to a forestry concern, from the villagers point of view the stoves became important because they were seen to respond to other priority problems as well.

## 5.5. Conclusion

With the environmental crisis in BISS one of the problems is the multiple causes and effects of it and the experience of the crisis at the household level. The perception of the crisis differs from BFPP who sees it strictly in terms of deforestation. Consequently the strategies selected by BFPP as responses to the environmental

degradation are not necessarily appropriate for solving fuel shortage in the households.

The resources that tenants have access to for dealing with firewood shortage are limited. It is argued in Chapter 8 that to a degree these resources are put under increased pressure through the forestry development, as tenants are expected to put time, labour and money to forestry activities rather than strengthening their income generation through agriculture.

# 6. THE RESPONSE OF WOMEN TO THE DOMESTIC FUEL CRISIS IN BURA

## 6.1. Introduction

As I have demonstrated in the previous chapters, it became apparent in the early stages of the research programme that women are a special interest group regarding the domestic fuel shortage because of their central role in fuel procurement and use in the household. In Section 4.3.1. I have indicated that both men and women were involved in the stove programme. However, overall women's participation in SERP was greater than that of men. This was because after the training women had more of a vested interest in building, using and maintaining the stoves. Through the monitoring of these activities we, the research team, developed a close relationship with women's groups, which existed in seven villages during the fieldwork, and individual women.

Women are also of fundamental importance to proving the hypothesis of this thesis. It would be false even to attempt to assess the impact of a forestry project on the recipient community without paying attention to women as a special interest group for the reasons stated above. Equally in this case study it would be impossible to draw conclusions on PRA as an empowering approach without analyzing women's opportunities for participation in the development of forestry activities in Bura.

Women's groups in Kenya have been particularly strong among the Harambee groups, which today are recognized by some as the strongest indigenous development agencies in Kenya (Mutiso, 1975). As 90% of women work on farms,

27% of households are female headed and 88% of women live in the rural areas, the importance of women to a development strategy focusing on agriculture has become obvious (Feldman, 1984; Andrehn et al,1986). At the same time women own only 5% of the land and their access to resources, such as cash to buy more land, is extremely limited. Women are also under pressure to register land in their husband's name (Feldman, 1984; Mackenzie, 1986). In 1976 the Women's Bureau was formed to function within the Ministry of Social Services to ensure equal development opportunities (op cit). Despite recognition from politicians (Mboya, 1970) women have been involved in decision making only nominally.

In Third World countries women are particularly hit by deforestation in their daily struggle to provide food for families. I argue here that there are two consequences of continuous deforestation, environmental degradation and household fuelshortage, and that solutions focusing on the first do not necessarily ease the second.

As it seems that the forestry solution is not adequate to solve the domestic woodfuel crisis, I look at domestic fuel economy in Bura, and particularly at how the shortage of woodfuels is perceived to constitute a crisis situation from the view of development professionals on the one hand and the users of woodfuels, mainly women, on the other. This leads to a question on the prioritization of the crisis according to these different perceptions. Finally, I will look at strategies designed within households for responding to the domestic energy crisis, and the role of PRA in defining these strategies.

## 6.2. Perceptions of woodfuel crisis

The changes in the availabilityof natural resources to meet human needs are globally visible. Our attention has been drawn, by governments and non-governmental organizations alike, to the massive destruction of tropical rainforests and the threatening spread of deserts. Collected data confirm that indeed there is an environmental crisis of global importance (Harrison, 1987). In 1980 FAO estimated that by the turn of the century 150 million people will be facing an acute scarcity of woodfuels and 1.8 billion people will be relying on overcutting of available forest resources for domestic fuel needs (Eckholm et al, 1984). By some estimates the speed of deforestation is such that one millionacres are deforested each week, or one hundred acres a minute (New Internationalist, 1988, pg 16).

As I have already pointed out, women are major contributors to agricultural production in Africa. In Kenya, they contribute 60% of labour to agricultural production in general, and to subsistence agriculture their contribution is even higher (Andrehn, 1986). Before deforestation develops to a stage where an acute domestic fuel shortage is felt, the process of environmental degradation has usually already caused agricultural productivity to fall. Increased use of agricultural residue for fuel and deprivation of soil nutrients, result in reduction of yields and livestock-carrying capacity of land, and thus in clearance of new land for agriculture. This vicious circle enforces the process of environmental degradation. For women the crisis is compounded by increases in their labour load as men migrate in search of urban employment, an option seldom open to women (Cecelski, 1987).

Even if domestic fuel shortage is such a complex issue, attempts to respond to this shortage have been largely limitedto development and implementation of afforestation strategies. These vary from community forestry to large scale industrial fuelwood plantations. As the shortage is interpreted in terms of quantifiable natural resources, rather than in terms of the reasons for increased pressure on them, the household energy crisis is being dealt with in terms of symptoms rather than real causes.

With the heavy reliance on woodfuels, rural households are themselves often blamed for the shortage they struggle with. In an ILO study on energy and women's work carried out in villages of Peru, Ghana, Mozambique, India and Indonesia, it was found that women themselves did not necessarily perceive a connection between their fuel use and deforestation. The feeling usually was that the deterioration of the environment was due to external forces, not under the control of the community (Cecelski, 1987). This is also true in the case of Bura and is discussed in 7.2.2.

## 6.3. Changes in domestic fuel situation

When the first tenants arrived in Bura, fuelwood was not a problem. The necessary firewood was found as deadwood in the immediate vicinity of the villages. Since 1981 the situation has deteriorated rapidly. The environment around Bura was never expected by those involved in the Scheme planning to provide for the woodfuel needs of the settlement scheme. The situation has developed into one of serious scarcity, where the resources of both people and the environment are stretched to their limits. This is reflected in increasing scarcity of deadwood in the riverine forest and the rising price of fuelwood.

In the case of Bura the women blame the very thorough bush clearing that took place prior to the construction of the Scheme infrastructure for the rapidly depleted fuel supply in the vicinity of the villages. By 1984 twenty-eight village sites had been cleared, but only ten villages had been built. There are still areas in Bura that were cleared in the early eighties, where nothing has been planted or built since. These areas have been vulnerable to wind erosion and there is some doubt over the present soil quality with regard to future use. During past years the deadwood in the Scheme has largely been collected and used, and now the pressure is on the riverine forest.

The women in Bura did not perceive firewood collection as causing deforestation. Similarly, deforestation is not considered to be the main cause of fuel shortage within the household, or indeed this shortage to be the priority problem. Fuel shortage in the house is seen by women to be caused by lack of labour and time to collect fuel while simultaneously contributing to agricultural production, by the increase in prices demanded by the fuel dealers (Table 6.1.), and by the scarcity of alternative fuels. The women do not have available to them to the usual degree the alternative fuels from agricultural residue since, by law, cotton is grown in closed seasons. This in theory means burning the stalks on the fields rather than using them to supplement other fuels. Similarly the Irrigation Act forbids husbandry of livestock on irrigation schemes in Kenya (Republic of Kenya, 1967).

The main problems women face in Bura are related to income generation. All agricultural production is controlled by Scheme management, and resources for generating additional income are not readily available. The crops are determined by

Table 6.1. Development of Average Fuelwood Price (Bura)

| | |
|---|---|
| 1981 (first tenants arrive) "free" accesss to firewood | |
| 1984 (November) a donkey cart of firewood | = 50 KShs |
| 1985 (December) | = 75 KShs |
| 1986 (June) | = 100 KShs |

* The prices fluctuate according to the financial situation of tenants on the Scheme, and the location of the villages in relation to the riverine forest.

Source: interviews in the villages

the management, so market gardening is based on a 0.05 ha plot per household, allocated by the Scheme and intended for vegetable production to meet subsistence needs, and growing vegetables in the immediate vicinity of the house. In addition to these restrictions, the proceeds from cotton production are paid directly to the tenant, who in 82% of the households is the male head of household (Vainio-Mattila,1987). Consequently women, despite their contribution to the production of cotton, cannot always look forward to a financial reward for their work.

The order of priority of the fuel shortage as a household problem by women was further clarified when, after the improved stove was introduced in the area, we asked

them why they had switched from the Three Stone Stove to the Improved Mud Stove. The first reason was its greatly improved safety for children. As the pots could be placed inside the holes there was no danger of these fallingon the children, and since the fire was enclosed, it was possible to leave small children in charge of tending the food. (Maize and beans, the staple diet in Bura, can take 4-6 hours to cook). The second reason was the easier rationalization of time use as it was possible to cook two pots at the same time. Thirdly, smoke was led out through a hole in the wall, thus improving the kitchen environment. And finally, the new stoves used less fuel, and thus involved less work in obtaining firewood.

To speak about deforestation in the Scheme area of Bura, is perhaps to give the bush clearing too grandiose a term, but underlying processes are very similar to those in the Sahel for example. Land is needed for agriculture as the pressure for cultivable land through population increases, erosion and political pressures increase elsewhere.In Bura the vegetation that had been cleared for the village site construction was offered for fuel and was piled up in the vicinity of villages. This was largely rejected, though, because better burning material was still available (in 1982) and also snakes made their homes in the piles.

As the pressure on the riverine forest has increased from the Scheme, the pressure on the forest resources has increased from within the riverine zone. This is because most of the unofficialsettlement in the rural centre and nearly all of the junior staff use charcoal for cooking (Table 5.2.). This charcoal comes from a strip of the riverine belt from Nanigi to Hola (Figure 3.1.). Charcoal burning, though illegal, has become a

profitable source of revenue for increasing the income that has been depleted along with the agricultural production in the riparian economy. This decrease in income is at least partly caused by the developments upriver controlling floods (Chapter 3). Apart from Village 10, the use of charcoal is not wide-spread among the tenants.

As discussed in Chapter 5 the tenants in Bura have a choice between bought and collected firewood, charcoal, kerosene and agricultural waste. Gas will be an alternative when the economic situation improves; at the moment it is out of reach for most tenants, although gas fridges can be seen in some shops owned by the tenants who had been able to arrive on the Scheme with resources from home.

The increased distance for firewood collection has also had an impact on intra-household division of labour. Firewood is still regarded by tenants as something that primarily women are responsible for, but women are increasingly having to depend on men for either the actual collection of firewood (on bikes or with wheelbarrows) or for money to purchase the fuel. This results in women's space being diminished, as they effectively lose control over resources they need in order to fulfill expectations regarding provision of food. When women compensate for the lack of technology (wheelbarrows/bikes) and money by using resources that they do have control over (their own and children's labour and time) to fetch firewood from further away, this means that less of these resources are available for agricultural production.

Thus the deterioration in forest resources has also had an impact on women's resources in other sectors. In the following I will examine which resources women in

Bura had access to and control over for responding to the fuel shortage.

## 6.4. Women's resources to meet domestic fuel shortage

With the acceptance of the Nairobi Forward Looking Strategies (see Chapter 2.4.4. Womens's space) the signatories committed themselves to increasing women's access to and control over resources for development (United Nations, 1985). The experience has been that when women are not explicitly given the opportunity to participate, development projects have marginalized women and

"constrained women's traditional productivity because such projects were not grounded on an analysis of what women and men actually do, and what they are responsible for, in the local economy."
(Holcombe, 1988, pg 2)

In order to gain understanding of the relationship of women and resources, we need gender disaggregated analysis of access to and control of resources. I think that this analysis should focus on the household, which as a unit, for example, makes management decisions, provides labour, and markets produce (Charlton, 1984). Boserup (1970) has made a distinction between male and female farming systems. In a female farming system food is produced exclusively or predominantly by women, as is the case in Bura, and in case of a male farming system the opposite would be true. This differentiationis due to differences in the type of cultivation and in the social system within which they exist (Deere et al, 1982).

In their study on gender roles in development projects Overholt et al have proposed a useful profile for identification of access to and control over resources and benefits based on gender. The argument upon which the profile is based is that it is essential to differentiatebetween access, which does not necessarily imply the power to control the resources, and control, which is to impose one's own definition upon the other actors in the situation. I have adopted this profile for identification of access to and control over resources and benefits in forestry in Bura. The profile (Table 6.2.) is a summary of the following discussion.

The real difference in terms of access to land in Bura between men and women is in access to tenancy, as men are prioritized for tenancy. For production of cotton and maize, as well as for a vegetable garden all tenants are allocated land. They have no control over which land they will be allocated each year, and as the quality of soil varies (see Figure 3.10.) their potential harvest willalso vary from year to year. A more categorical difference in access and control between genders is evident regarding money. As I have explained above (see 5.3.1.) money is paid directly into the bank account of the tenant, usually the male head of the household. Women's access to money is particularly difficultin cases of absentee tenants, where men have remained outside Bura. Control is also difficultas because the price of agricultural inputs is reduced directly from payment, some tenants are incurring debts (Figure 5.1.).

Access to hiring labour from outside is related to availability of financial resources. With the tenancy system and the accompanying payment arrangements, itis clear that men have more access to financial resources. It was often evident in our discussions

Table 6.2. Gender profile of Access to and Control over Resources and Benefits in Forestry in Bura

| | ACCESS | | CONTROL | |
|---|---|---|---|---|
| | M | F | M | F |
| I Resources | | | | |
| Land | ++ | + | -- | -- |
| Money | ++ | + | + | - |
| Equipment | + | - | + | - |
| Labour | + | + | + | - |
| Training | - | -- | -- | -- |
| Entrepreneurial | + | + | + | + |
| Water | + | + | - | - |
| Employment | + | - | - | - |
| Forest | | | | |
| Firewood | + | ++ | - | - |
| Charcoal | + | - | + | - |
| Poles | + | - | - | - |
| Income | - | - | - | - |
| II Benefits | | | | |
| Outside income | + | - | - | - |
| Assets owner-ship | -- | -- | -- | -- |
| Information | + | - | - | - |
| Political power | + | - | - | - |

++ = good access/decisive control
+ = some access/control

- = little access/control
-- = no access/no control

M = male
F = female

Note This table is a comparison of access/control based on gender. A profile analyzing the impact of BFPP on these resources is discussed in Chapter 8.

Source: Profile form based on Overholt et al (1985). Content based on interviews in the villages

with women on the Scheme that they did not have access to information about household financial status either. Labour for agricultural work is otherwise available. The tenants receive training from the Scheme and District extensionists, through individual encounters in the fields and at home, as well as through village meetings. Women are at a disadvantage because the extension workers, apart from the home economists, are men and do not perceive the importance of reaching women with information directly relevant to agricultural production. Entrepreneurial possibilities are few. Some households have established small kiosks/bars etc. in one of the rooms of their house. Most of these are seasonal in that the shopkeepers cannot afford to replenish their stock throughout the year.

The tenants have no control over water for irrigation, other than to use it when it is available. The Scheme does not accept the use of clean drinking water provided to the households to be used for vegetable growing or tree watering, but at times this is a vital supplement to tenants' livelihoods.

Although some women are employed in forestry activities through the "Food for Work" programme, there are extremely few employment opportunities for women. The opportunities for men are slightly more, as they have access to casual employment in BISS.

With forest related resources the main differences in access and control between genders are that men have better access to charcoal, which requires money, and to poles, which require a permit from the Forester. Both have equal physical access to

firewood, but women are socially expected to collect it.

I have argued in this thesis that the fuelwood shortage is a domestic crisis. This is because the impact of the wood scarcity is centred on the household. I am now going to examine domestic alternatives for dealing with the shortage.

## 6.5. Domestic strategies

I willconsider the domestic strategies for responding to the fuel shortage in two parts. In this chapter I will cover alternatives that do not involve the stove. In the next chapter on the stove programme, I willdiscuss in detail the development of the stove programme in Bura.

The resources used for the general strategies were discussed in Chapter 5. The alternatives discussed under this heading are often opted for more out lack of choice, than through intentional planning. The stove programme, on the other hand, was identified as a household level solution to the fuel shortage based on existing resources. The process that took place with PRA, as described in Chapter 4, made it possible for women to come together and through sharing experiences and views arrive at an alternative which they could implement.

Collection of firewood by women is the most basic form of obtaining fuel. The proportion of households relying only on collected firewood has declined since 1984 quite clearly (Table 6.3.); at the same time buying has markedly increased.(Vainio-Mattila, 1985b)

The most obvious reason for this is the increase in the distances that must be covered in order to collect sufficient wood. This is supported by the fact that in Village 8, which is closer to the riverine forest, more people still depend solely on collection. Villages 1 and 10 are furthest away from the riverine forest. No doubt the economic stabilization which has taken place in the Scheme through the process of settlement establishment has also contributed. On the other hand Village 10 has from the beginning depended on bought fuels. Its situation near the rural centre meant that the deadwood in the village surroundings had already been consumed by 1984, when the village was settled (Vainio-Mattila,1985b). Those who collect in that village do so near Villages 15 and 16, which are yet to be built, thus already creating a future shortage. (For location of villages see Figure 4.9.)

By 1987 the shortage had not yet developed so far as to cause general changes in diets, although it was possible to find a household where no hot meal had been eaten in two days. This was rare, but it was the opinion of the medical Sister that malnutrition was increasing in Bura (Personal communication from Sister Lucy, Bura).

When tenants use charcoal, it is mainly for preparing the morning meal, and is preferred due to the quickness of the method. Paraffin is used in the same manner. Cost prohibits the use of these for all cooking needs. (In 1985 the cost of 187 litres of paraffin, which would have been needed to replace 1 m3 of firewood, was 1589.50 KSh at the prices in Bura market). Cotton stalks and maize cobs are only used as a last resort. In their unbriquetted form they burn quickly, and do not produce enough charcoal. Also, tenants are unsure whether they are allowed to bring the cotton stalks

Table 6.3. Firewood Collection and Buying by Villages

| VILLAGE (no. of households) | | BOUGHT | BOUGHT/ COLLECTED | COLLECTED |
|---|---|---|---|---|
| 1984 | | 14.5% | 49.5% | 36.0% |
| 1986 (vill 1) | 160 | 75.6% | 18.2% | 6.1% |
| 1986 (vill 2) | 210 | 58.5% | 19.5% | 22.0% |
| 1986 (vill 3) | 172 | 63.3% | 16.7% | 20.0% |
| 1986 (vill 4) | 155 | 66.7% | 7.4% | 25.9% |
| 1986 (vill 5) | 199 | 73.3% | 10.0% | 16.7% |
| 1986 (vill 6) | 140 | 51.6% | 35.5% | 12.9% |
| 1986 (vill 7) | 161 | 60.0% | 16.0% | 24.0% |
| 1986 (vill 8) | 180 | 64.3% | 7.1% | 28.6% |
| 1986 (vill 9) | 208 | 35.7% | 25.0% | 39.3% |
| 1986 (vill10) | 145 | 55.6% | 37.0% | 7.4% |

Source: Vainio-Mattila,1985b and interviews in the villages

from the fields into the village. In fact it is forbidden but they are used during the harvest time to supplement wood, and to fence kitchen gardens around the house. As such, agricultural residue seasonally represents the kind of "free" resource fuelwood once was. This also means that women have access to some means of supplementing firewood.

In summary, at household level there are three general strategies for reducing the pressure created by shortage of fuels; simply less is used, firewood is supplemented with agricultural residues and, when affordable, alternative fuels are sought. Of these three the first one naturally is highly undesirable if it has a detrimental impact on diet. One way of "simply using less" is to use a stove which consumes less fuel but gives

adequate heat for cooking.

## 6.6. Conclusion

Conventional forestry plantation strategies may be effective in environmental protection. That is, after all, how they were developed. In dealing with the household crisis, though, they tend to alienate the main interest group, the women, through professionalization of forestry activities. To effectively respond to the household crisis means designing strategies that increase women's resources, and their power to control those resources.

Women's role in forestry, their use of forestry products, knowledge of forestry practices and income generating activities based on forestry and agroforestry practices are well documented and generally acknowledged across the world. But it is not the women with this knowledge who are involved in developing forestry projects in their areas. The role of women in planned forestry development is negligible. Their input seems to be allowed in two categories; either as workers or at the recipient end of extension.

# 7. THE IMPROVED STOVES PROGRAMME

## 7.1. Introduction

Improved stoves programmes mushroomed during the early 1980's. They were seen as a technologically appropriate solution which was also characterized by some attractions of sustainability. Stoves programmes involved rural community members in differentstages of planning, implementation and evaluation and they were replicable in large numbers. Both governments and non-governmental organizations initiated such programmes. When the first International Workshop on Wood-Stove Dissemination took place in Wolfheze (The Netherlands) in 1983 itwas already evident that different schools on the type of stoves had emerged (Clarke, 1985).

Ithas been the experience in many places that the introduction of so-called improved stoves has not necessarily produced the desired results (Prasad, 1981; Masse, 1985; Joseph, 1985). It is often doubtful whether a really substantial saving of fuelwood is achieved (Foley et al, 1983, Prasad, 1981). As the stoves usually induce changes in cooking practices, it may even happen that more fuel is consumed. That in Bura the difference with the Lorena-type stove is over 30% (Table 7.4.), reflects in my opinion, the acute and real unavailabilityof firewood, so that the stove is really used to its full potential by the cooks. However, if stoves are not maintained, or firewood should become more readily available, this might change.

The main discussion has centred on the issue of user built stoves versus industrially manufactured stoves. On one hand of the debate are those who maintain that the

stove design must be perfected with the aim of producing as efficient a stove as possible. It is acknowledged that the design is often based on complicated engineering principles, but:

"Complexity is the price paid for honouring diverse cooking habits and using only locally available fuels, materials and skills."
(Prasad, 1985, pg 59)

The central issue is who has control over the development of the actual design. Like Prasad, others believe that the designing is a job for professionals but that it is important to involve users at other stages. The argument is that materials and skills available to the users are more limitedthan those available to engineering departments and laboratories, for example. Designing to meet needs, not always specifically identified, is not a simple task:

"Engineering design is an optimization process involving several conflicting demands... Much of the intransigence exhibited by consumers in not accepting the newer stove designs may be due to the fact that the designs do not meet consumers' needs"
(Prasad, 1985, pg 59)

It is widely accepted that the issues concerning stoves as new technology are wider than just engineering concerns, and have cultural, economic and political implications. It is also accepted that ecological arguments are not necessarily influential among users who can rarely afford to think in terms of conservation. (Joseph et al, 1984; De

Lepeleire, 1985; Masse, 1985; Micuta, 1985; Gamser, 1988)

Matthew Gamser (1988) is a strong voice for the school which maintains that it is not only desirable that users should be involved in development of technological designs but necessary. This is a way of increasing the likelihood that the knowledge and skills of the users will enhance the final product. He worked in the Sudan Renewable Energy Project using Research and Development (R & D) methodology. Based on this work he argues for methodologies that allows for more interaction between users and technology development institutions as a basis for increasing the recognition of user contribution to innovation.

On the basis of my work in Bura I would argue that in addition to user participation in technological innovation it is important to acknowledge the power such innovations can represent. In a situation of participatory assessment when people find that they have access to resources which, when combined with innovation, can be a (partial) solution to a priority problem, they can retain, and even increase, control over their own life circumstances.

In this chapter I will first assess consumption of firewood in Bura, and then analyze the stove programme that was developed.

## 7.2. Consumption of fuelwood in Bura

The estimations for firewood demand in Bura have been based on experiences in similar semi-arid areas elsewhere in Kenya and Africa and on results of short surveys

in the area. The estimations in Table 7.1. correspond well to the figure of 1 $m^3/c/a$ which has been used as a basis for planning of BFPP strategies.

In order to fully appreciate the possible fluctuations in fuelwood consumption in Bura, it is necessary to understand the factors which determine the choices made concerning domestic energy.

It was clear from the beginning that if a large number of people were to be settled in Bura, the fuelwood resources would have to be supplemented. In the first place, the scarce bush would not be able to supply enough fuelwood to meet the needs of the settlers, and secondly, 50 km south of Bura, in Hola virtual disappearance of the riverine forest had already been experienced.

The long-term effect of the stove programme on firewood consumption remains to be seen. The potential effect is reflected in Table 7.2., where the estimates are expressed by comparing the amounts consumed by those using the open Three Stone Stove and those using the Improved Mud Stove. These figures are based on the cook's estimate of the daily consumption of the household. She/he set aside the amount thought to be sufficient for one day's cooking. This was weighed and then converted into solid wood measurement by using a specific gravity factor of 0.75. The figures obtained in this manner correlate well with studies done in similar areas (Table 7.2.)

The difference in consumption of firewood is really a difference in consumption between those cooking on Three Stone Stoves and those using the Improved Mud

Table 7.1. Estimations of Firewood Demand in Bura (solid wood)

| SOURCE | ESTIMATE |
|---|---|
| 1. World Bank 1977 | 0.991 $^3$/capita/annum |
| 2. Republic of Kenya 1977 | 0.7 $^3$/c/a |
| 3. Hughes 1984 | 1.125 $^3$/person/a * |
| 4. Vainio-Mattila 1985 | 0.99 $^3$/ALU/year ** |

* specific gravity factor 0.75
** specific gravity factor 1.0

Table 7.2. Consumption of Firewood (1986, Bura)

| VILLAGE | 3-STONE STOVE | IMPROVED STOVE | DIFFERENCE |
|---|---|---|---|
| 1 | 0.9 $m^3$/c/a | 0.5 $m^3$/c/a | 44% |
| 2 | 1.1 $m^3$/c/a | 0.9 $m^3$/c/a | 18% |
| 3 | 1.3 $m^3$/c/a | 0.6 $m^3$/c/a | 54% |
| 4 | 0.9 $m^3$/c/a | 0.7 $m^3$/c/a | 22% |
| 5 | 1.1 $m^3$/c/a | 0.6 $m^3$/c/a | 45% |
| 6 | 1.1 $m^3$/c/a | 0.7 $m^3$/c/a | 36% |
| 7 | 1.9 $m^3$/c/a | --- | -- |
| 8 | 0.9 $m^3$/c/a | 0.6 $m^3$/c/a | 33% |
| 9 | --- | --- | -- |
| 10 | 1.9 $m^3$/c/a | --- | -- |

Source: interviews in the villages

Stove, not a drop in consumption when a cook switches from the Three Stone Stove. In each village the daily firewood of all those using the Improved Mud Stove was weigehed and an equal number of households with the Three Stone Stove was chosen for having their daily firewood weighed as well. It is difficultto say at this stage how long-term this difference is, but based on the weighings we carried out these figures it would seem safe to assume that the Improved Mud Stove reduces the amount of wood needed by at least 30%.

The fuelwood situation has been deteriorating since the tenants arrived but by the end of the fieldwork this had no impact on the actual consumption. The change was making villagers conscious of the scarcity, though, and in the following I discuss the changes and the villagers', particularly the women's, reaction to them.

## 7.3. Stove programme

Through the participation of the villagers, especially women, improved stoves were identified as a household level response to the fuel shortage. The stove programme in Bura did, during the course of the fieldwork, take on a more dominant role in the research than planned. The original intention was only to build some demonstration stoves in each of the villages (Enso-Gutzeit, 1985b). This, I think, was because the stoves proved to be an entry point into a discourse on household energy economy. It is not suggested here that the improved stoves are the answer to the household fuel crisis. I suggest, however, that the identification of strategies to meet this crisis needs to start from within the household.

It cannot be claimed that the improved stoves could alone provide a solution to the energy crisis in Bura, any more (or less) than afforestation alone can, but it could be said that in the course of their introduction, deforestation, lack of firewood and other relevant issues have become matters of which villagers have become more aware and on which they express their opinions. At the same time, related issues of labour, child care and health, among others, were also discussed, thus providing the research team with information regarding the priority problems in villages.

### 7.3.1. Stoves presently in use

The most common stove in Bura (as in the whole of rural Kenya) is the so-called "Jiko ya Mawe Tatu" (Sw. for three stone stove). The three stones are placed at equal distances from each other and the fire is built between them. The fire material, usually arm-thick pieces of wood, are fed in from at least two sides and often from all three openings between the stones. By controlling the distance between the heads of the pieces of wood, the cook can very efficiently control the size of the flame. The "sufuria" (Sw. for pots) used for cooking are round, with a one-centimetre-wide brim, are made of aluminium and vary greatly in size, from one litre up to ten litres, and even bigger for industrial use. Lids are seldom used.

There are several points that should be raised before disregarding the three-stone stove as an inefficient alternative. In some parts of Kenya the open fire is used for warming the living quarters, and although this function is not so important in Bura, the open fire does provide light and thus saves the owner the cost of kerosene for light. However, I never encountered in the tenants' houses an open fire, or any stove, that

had been built in a room other than the one designated as a kitchen, which in turn again was never used for socializing.

When considering alternative stoves, especially stoves where the smoke is led outside, a point about the function of the smoke is often raised. Especially in the coastal region of Kenya, it is common to see the crop stored above the stove, so that the smoke functions as an insecticide, and it also speeds drying of the crop. However, the tenants' houses in Bura seem to be so low that it is impossible to build the platform upon which the maize could be stored. In Village 8 I saw a few houses where the owner had built the structure, but then that had meant turning one room into a granary, with the crop resting on a platform raised to about shoulder height. The problem with the insecticide function is that although it may dispel mosquitoes, smoke is not harmless to health. Lung disease and respiratory problems resulting from air pollution in kitchens are a major health problem for Third World women (Smith, 1987). This must be weighed carefully against the positive effects of smoke. The weightiest reason for leading smoke outside, however, is that the tenants in Bura prefer it. Since smoke cannot be utilized profitably and is unpleasant as well as unhealthy to inhale, in the view of many of the tenants it is better to have it outside.

No detailed analysis was made as to what other meaning the three stones have for the cook apart from their stove function. In the riverine area, for instance, it is customary to carry the stones to a new home, even over long distances, and in some cases women told us that one of her stones was from her mother's stove. Also, I saw twice that even if someone had built a new stove, she had broken one of her stones

into three fist-sized pieces and inserted them on the "sufuria" supports, so that the pot continued to rest on them. Sometimes they were removed in an embarrassed manner when I was present. According to Dr Swantz in some cultures fire is a sexual symbol and the stones are attributed procreative symbolism related to the fertilityof the family line. (Verbal communication from Dr Marja-Liisa Swantz, Helsinki).

Another locally used stove type resembles the more sophisticated charcoal stoves made of metal sheets, for example, the Kenya Improved Jiko. This is portable and is used mainly by the nomads in temporary camps. The fire material can consist of charcoal, but more often of small twigs and pieces of combustible material. The food is not usually cooked for long, as it is traditionallymilk based, but in Bura these days many of the pastoralists are involved in the "Food for Work" programme, and receive maize and beans as pay. This means that cooking takes longer, and ifthe camp stays in Bura long enough for this kind of involvement, the Three Stone Stove is adopted.

### 7.3.2. The Improved Mud Stove

When the stove programme started, a new stove had already been introduced to Bura. This stove, a derivative of the South American Lorena stove, had originallybeen introduced to south Tana by an American Peace Corps volunteer, and from there it had spread via the Home Economist Department of MoALDto Bura. The first ones had been built in 1982/83, and by May 1985 there were some ten of these stoves on the Scheme.

It seemed a good idea to continue with this stove rather than to introduce another

one, for several reasons. First of all this stove was very basic and seemed like a good starting point. It only had a minimum chimney structure and no fire-box doors. It was about knee-high, which was also good, because choosing a higher alternative would have involved raising the whole kitchen, which did not seem realistic. The stoves built within this programme were basically the same, only some measures were standardized to facilitate their building. (For drawing of stove see Appendix 4)

One very strong point in favour of this stove was that it could be built completely with materials available locally, and moreover with materials that did not on the whole cost any money. (In one village, when the demand for cow dung rose suddenly, the cow owners charged a price per bucket, but the leaders of the village managed to negotiate the situation so that the charge was erased). Also the building of the stove was relatively easy and the people were familiar with the building materials.

From the cook's point of view, an additional bonus was the possibility of planning time, since with the Improved Mud Stove she was able to cook two dishes at once, or have hot water available at any time. This is also the major characteristic of the stove contributing to any fuel saving.

### 7.3.3. Stove diffusion

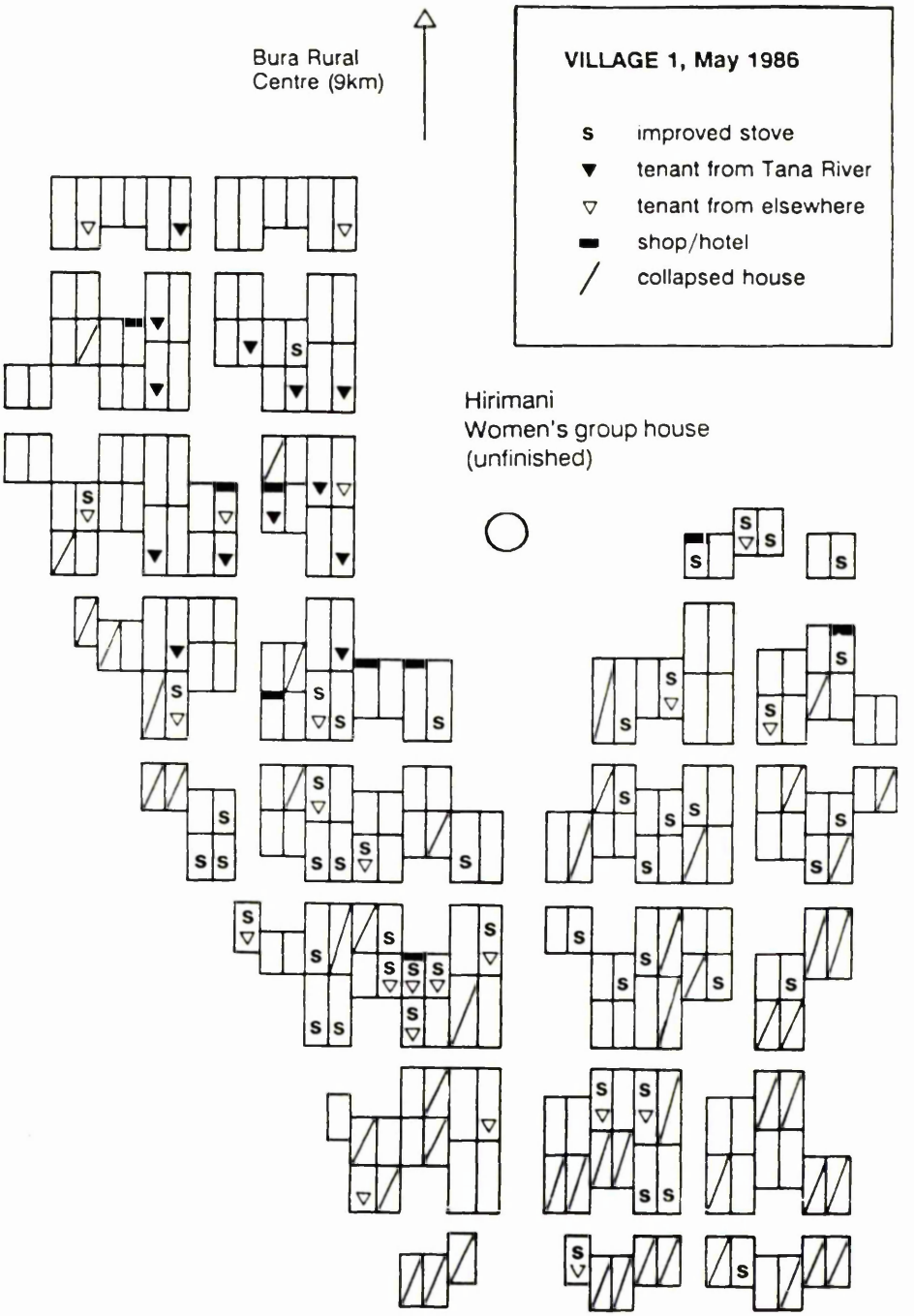
Ethnic, linguistic and religious affiliations are all important in an analysis of innovation diffusion in Bura. In order to make some of these trends explicit I would like to use Village 1 as an example.

Village 1 was the first village where a stove workshop was held. It was prepared for by attending two village meetings and interviewing. Present at the first village meeting were most of the village leaders, as well as leaders from the surrounding area representing the pastoralist community, and at the second one we, the research team, met about fiftyvillagers. During some two months prior to the workshop we had been getting to know the people better, and also became familiarwith the differentgroups existing in the village.

From the outset it was clear that ethnically there were three distinct groups in the village. These were those who have arrived from Central and Western Kenya, and those originally from Tana River. Moreover, the latter were Muslim, and lived together in one part of the village (Figure 7.1). The Western and Central groups were united by their Christianity, which in this village was very strong. There were at least three churches within the village, and an established Catholic church in the neighbouring village. Although the Western and Central groups had problems with each other based on the history of the groups, as well as a language problem, they were united in trying to cope with a new, fairlyhostile environment. They also had explanations as to why it was difficult to establish contact with the people originating from the Bura area. These explanations were: "They are afraid of us." "We come from a better area, with more schools, they don't know how to talk with us." The probable explanation, though, was quite simply that the Tana River group did not need the newcomers in the way these needed each other.

The workshop was arranged some two and half months after the initialcontact with

Figure 7.1. Stove Diffusion in Village 1




Source: fieldwork in Village 1

the village. It was attended by a nucleus of ten women and ten men, including the headman, the chairman's wife, the chairlady of the Hirimaniwomen's group, and a woman who was respected among the women not belonging to the women's group. There were bachelors among the men; this had been thought particularly relevant by the headman. The group of twenty also included a carefully chosen (by the headman, not the Muslims) participant from the Islamic community of the village. Apart from the nucleus group, the different functions of the workshop were also attended by a varying group of interested villagers. The day of discussion at the nursery was attended by approximately seventy people.

The first stove was built at the chairman's house. Afterwards, the five frames (Appendix 4) were distributed among those leaders acknowledged by the rest of the group to be good teachers. Within three months, nearly fiftystoves were built, but then very few were built afterwards. This reflected the end of close relationships with the teachers on one hand, and lack of interest on the other. By any standard, all expectations were exceeded. In three months over 30% of the tenants in the village built a new stove.

Two factors guided this dissemination. The workshop participants taught those who lived closest to them and spoke a language from the same language group. Rivalry developed between those belonging to the women's group and those who did not. This split was an expression of rivalry that generally existed between the Central and the Western groups, but was not expressed in those terms. The women's group was participated in predominantly by the women from western region of Kenya.

When these fiftystoves are plotted on a map of the village, it can, however, be seen that not one of the stoves had been built in the section of the village where tenants from Tana River lived (Figure 7.1). Why? One obvious reason could be that as these people have their "real" home very close by, they do not invest in the improvement of the house they have on the Scheme. The Scheme house is a base from which their agricultural activities are managed, and where the head of the household only lives semi-permanently. This raises questions about the suitability of the stove for every cultural context of the Scheme.

Apart from aspects of social structure, the diffusion of a new stove type naturally depends on how well it meets the requirements set for it by the user. A stove is always used for cooking (100%), but in addition to this it is used for light (12%), warmth (7%), ironing clothes (3%), meeting around it (3%), and for melting iron (1%), according to the interviews in Villages 1,6,8 and 10. The Improved Mud Stove is essentially for cooking only, it does retain heat, but does not give light, and the flame is not easily accessible. In cooking, though, it expands the cook's possibilities for time planning, as it is possible to cook with two pots at a time.

Another type of stove may turn out to be more appropriate for the pastoralists. Their food culture is quite different from sedentary agriculture based food culture. This was demonstrated in Village 9, where a majority of the villagers are Somali. A clear preference was expressed there for meat and milk in the diet, over the bean and maize based meals generally preferred by the Central peoples (Kikuyu, Kamba, Meru etc). For the way they are prepared, a quick strong flame is necessary, rather than the

slow, heat-conserving kind of method the mud stove allows for. It is common to see women maintaining the old cooking method alongside the new one.

When asked what is good about cooking on an open fire, 73% said nothing, but the rest appreciated that it is quick to light and it also cooks quickly. When asked the opposite, it became clear that there were two main reasons for wanting to shift to an enclosed stove. These reasons were that the open fire is unsafe (46%) and that it uses a lot of firewood (36%).

## 7.4. Conclusion

The stove programme in Bura was the most visible result of the participatory research programme. It has been a joy to hear that this programme still continues in Bura, and that in 1989/90 the research assistants together with the home-economist working on the Scheme developed together with pastoral people living in the vicinity of the Scheme a stove model appropriate for the pastoral communities. This is a mobile stove suited to cooking milk and meat. The mud stove programme, now with emphasis on maintenance, also continues.

In Chapter 8 I will assess the impact of Bura Fuelwood Plantation Project on the household resources in BISS villages. To do this I have used the same profile as in chapter 6, and studied it through reorganization of the specific interest space of BFPP, BFD, SERP and the tenant households.

# 8. IMPACT OF DEVELOPMENT AID ON THE RESOURCES OF THE RECIPIENT COMMUNITY

## 8.1. Introduction

In the previous chapters I have described and analyzed certain forestry related resources of the tenant households on the Scheme in Bura. As I have pointed out in Chapter 5, these resources are mainly controlled with legislation for irrigation schemes, and the households' opportunities for creating and implementing their own development strategies are limited. In this chapter I will evaluate the impact of the development aid project, BFPP, and its participatory component, SERP, on these resources.

As most tree planting takes place under direction of the Forest Department of BISS and BFPP, forestry activities as a part of the farming system of Bura are limited. Forestry related activities in the villages include household planting, such as fences and shelter belts, and firewood collection.

In this chapter I will also return to the concept of Specific Interest Space (SIS) introduced in Chapter 2. The analysis of the impact of development aid on the resources of a recipient community is based here on the resources within the Specific Interest Space of BFPP and tenant households. This means the resources in terms of which each has access to control and are physically, in terms of distance, accessible.

## 8.2. Impact of BFPP

In Chapter 5 I summarized the aims of BFPP and these give us some idea of what the impact of BFPP was intended to be. In short, BFPP was to ensure self-sufficiency in fuel production within the Scheme. In order to attain this aim the Project was going to make an input of financial, physical and organizational resources (Enso-Gutzeit, 1985b). The self-sufficiency in fuelwood production was to be developed upon these resources.

My argument is that even if BFPP were able to produce fuelwood at the rate planned, which at present it is not, it will not have an impact at the household fuel shortage because it has not boosted the resources of the villagers in Bura to respond to the shortage. In fact I will argue that in some cases the existence of BFPP has lessened the resources of the recipient community to find alternatives for firewood.

### 8.2.1. Resources introduced by BFPP

The question is whether the new resources created through BFPP have enlarged or diminished the resources controlled at the household level to develop fuel economy strategies. Or, in other words, is the space needed to accommodate BFPP usurping resources from existing strategies, or does it add to them.

Table 8.1. is based on an examination of the resources that are made explicit in the project document (Enso-Gutzeit, 1985b) regarding the implementation of the fuelwood plantation component. I have grouped these resources according to the

Table 8.1. Resources Introduced by BFPP

**I VISIBLE**

**1. Personnel**

a) Finnish
- Team leader/Field manager
- Administrative/Liaison officer
- Afforestation superviser
- Mechanical plant supervisor
- 3 short term consultants

b) Kenyan
- Forester and Assistant forester
- 11 Foremen
- Home economist
- Account assistant
- 3 Clerks and copy typist
- 3 Mechanics/maintenance men
- 10 Tractor drivers
- Storemen
- Carpenter
- 12-24 Guards
- 88 000 mandays of casual labour 1985-1987 for nursery construction/ operation,irrigation, direct seeding, planting, weeding, pruning, protection etc.

**2. Finance**
- 1985-1987 14 570 000.00 FIM Finnish government contribution
- Kenyan contribution to cover slaries of permanent Kenyan staff

**3. Technology**

a) Machines and equipment
- 1 bulldozer
- 1 site preparation plough
- 3 4WD farm tractor
- 2 12-ton trailers
- 1 8-ton trailer
- tank-trailer
- front-end loader with lifting forks
- grass cutter for compacting
- compost crusher
- rotavator
- 5 fungicide sprayers
- 3 4WD pick-ups
- 3 station wagons
- 5 light motorcycles
- 10 bicycles
- 2 fueltanks
- composting equipment
- sprinkler system for greenhouses and shaded areas
- pump station for the nursery
- watering system for plantations
- hand-tools and equipment for afforestation and logging

b) Construction materials

c) Seedling production materials

(cont.)

| II INVISIBLE |
|---|
| 1. **Ideas and ideals**<br>- to provide an adequate supply of fuel and construction wood<br>- to provide an environmentally satisfactory cover of protective woody vegetation<br>- to aim for sustainable development in forestry with no adverse effect on crop production<br>- to use the FORP and SERP in implementation<br>- to develop physical facilities and institutional framework<br>- to enhance motivation and skills of settlers<br>2. **Perceived resources**<br>- funding from FINNIDA<br>- existing forestry department<br>- tenants<br>3. **Control maintained by BFPP over**<br>- strategy<br>- implementation |

Note This table is based on the project implementation document (Enso-Gutzeit, 1985b) and does not necessarily indicate that all the above resources were available for use by the project during its first phase

framework developed earlier for analysis of aid (Figure 3.3.). The resources which are classified as "visible" are easy to extract from the document as they are also budget line items. The "invisible" resources are found more or less in between the lines and are also based on observations in the field. I would argue that it is these invisible resources that, such as ideas, ideal or control, give development aid its ideological form, and that they are also least controllable by the recipient at any level from community to government as they are difficultto negotiate.

Prior to BFPP the Bura Forestry Department (BFD) functioned under the supervision of the District Forestry Officer within the framework of national forest administration. One of the purposes of BFPP was to strengthen this structure. BFD operations depended on funding from the Forestry Department and on being able to use BISS resources, such as machinery. (Figure 8.1.) The forester had under his supervision staff, mainly casual workers hired on a seasonal basis, and equipment as well as funding to carry out forestry activities.

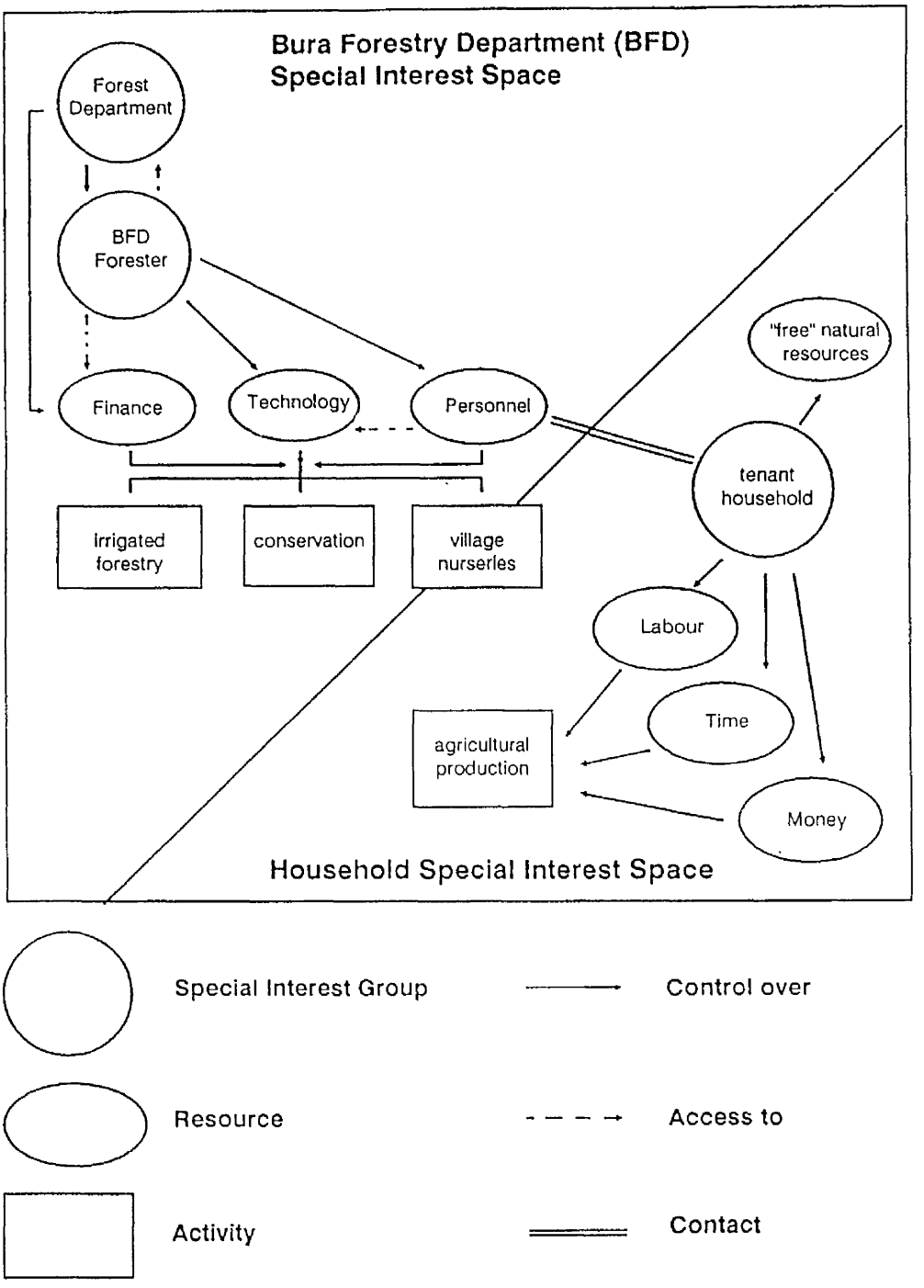
As is shown in Figure 8.1., the tenant households were not involved in BFD plantation activities. Already prior to BFPP some irrigated forestry had been started in Bura under the direction of the District Forest Officer. These plantations were a branch of forestry research that had been ongoing in Hola previously. The research activities within BFD were strengthened when FORP started operating in Bura in 1984. Until the research grew in importance, the main activity for BFD was forest conservation. In practice this meant monitoring the use of the riverine forest, and the protection of that forest through the supervision of forest guards. There was a small central

nursery in which seedlings were raised for research but also for distribution in the villages. The village planting was an uphill struggle until autumn 1985 when water became available on a household basis. On the active initiativeof the forester in Bura, shelterbelt planting in villages was started, the National Tree Planting Day was utilized to distribute free seedlings and seedlings were sold to villagers at subsidized prices. As a result of this policy, the personnel employed by BFD, mainly on a casual basis, spent considerable time in the villages. The forester himself became so well known that he was on a daily basis consulted by the villagers on matters not under his jurisdiction.

The village nurseries were also started before BFPP. The intention was to cut transportation and production costs and to involve the villagers in forestry activities. For this purpose the nursery headman, whose work included keeping records for the nursery, was employed from the village in which the nursery was located. The reason that I have in Figure 8.1. situated the village nursery activity partly in household SIS and partly in BFD SIS is, that the nurseries were physically (distance) located in the villages, and some villagers worked in them, but the villagers on the whole had very littleopportunity to influence (control) what was grown there, what the price would be or indeed who the nursery headman would be.

The resources that BFD had for carrying out the activities are familiarfrom the "visible resources" used earlier in the thesis. These resources were annually budgeted for the Forest Department. As I have already noted the BFD depended to a large extent on BISS equipment and on either casual labour employed by BISS, or labour

Figure 8.1. Specific Interest Space Related to Forestry Activities prior to BFPP




Source: Vainio-Mattilafor this thesisemployed within the "Food for Work" programme.

From the household point of view forestry related activities focused on firewood collection, which at this time was not difficultto find even without entering the riverine forest. For building poles villagers would turn to BFD personnel for permission to cut trees in the riverine forest. Only those tenants living in the close vicinity of water taps would actively plant trees around their houses prior to August 1985.

In summary, I have tried to show two perspectives on forestry activities in Bura prior to BFPP. From the BFD point of view, it was an active department with good contact to villages through the nurseries and plantation as well as conservation activities. From the village point of view personal contact with the forester and his staff was appreciated as it was usually accompanied by free seedlings. Apart from rare village meetings where the forester would be, BFD would only reach a small minority of villagers. These would be the "active" villagers, those "interested in planting", or, as I would say, those with reasonable access to water.

Table 8.1. lists the resources brought in by BFPP, and Figure 8.2. summarizes the network of resource utilization. Apart from the resources listed in the project document, also the already existing forestry structure in Bura was perceived as a resource for BFPP. BFPP and BFD became for all intents and purposes one. The aim of "institution building" would seem to indicate the location of new resources within BFD. However, as the team leader of BFPP was expected:

"to be responsible for all forestry development and operational activities in Bura in liaison with the Bura Irrigation Settlement Project management"

(Enso-Gutzeit, 1985b, pg 14)

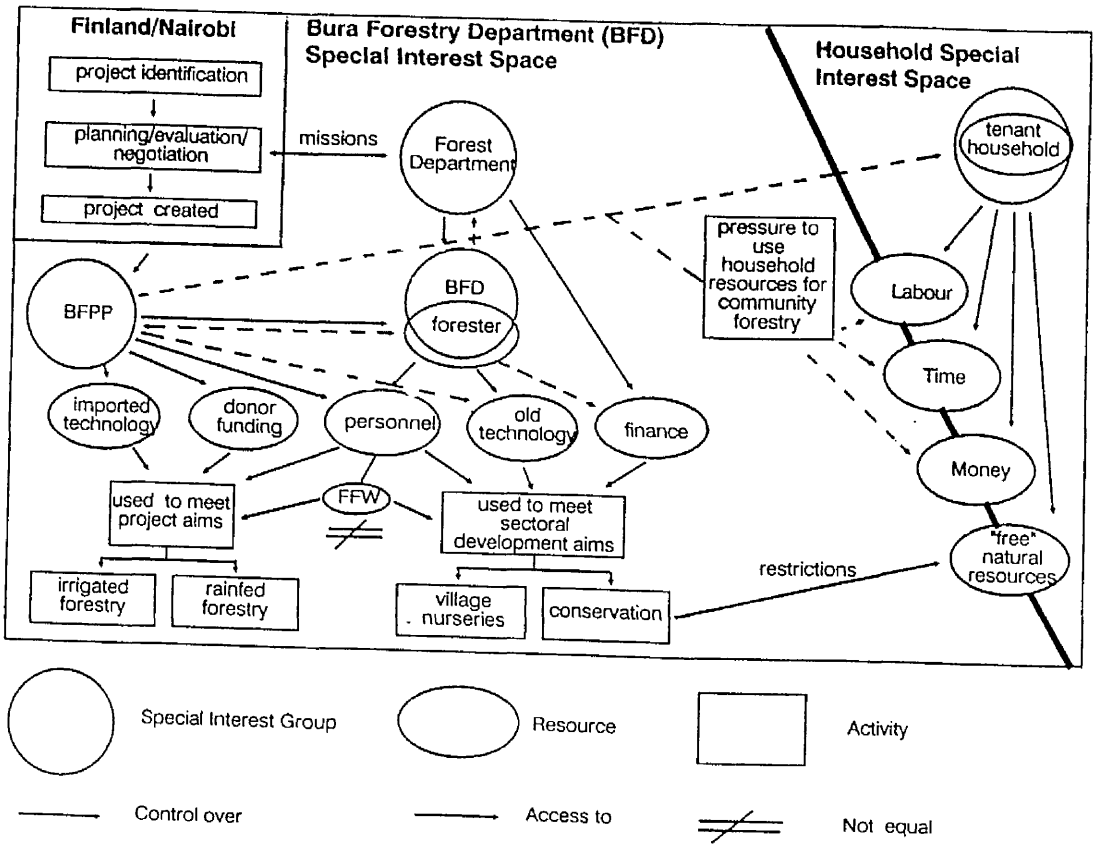
it becomes clear that a separate organization in charge of forestry was established beside BFD. In practice this meant that the Forester is seen as a resource for BFPP, rather than vice versa, and the forestry activities under his jurisdiction need to accommodate the new organization.

Another resource that is incorporated into BFPP as is shown in Figure 8.2., are the tenant households themselves. Rather than seeing existing forestry related activities and villagers' knowledge of trees and forestry as a resource, BFPP again needs the villagers to become familiarwith the new approach to forestry in order to be part of its implementation. As a result they hope that

"The attitudes of the villagers have been geared towards fuel saving and fuelwood production through extension work."
(Enso-Gutzeit, 1985b, pg 5)

In Figure 8.2. I have moved all tenant household resources on the border of their SIS. This is because, although the tenants retained ultimate control over the use of their labour, time and money, the BFPP strategy for community participation and conservation of the riverine forest increased pressure on their utilization. The participation of the villagers was implemented in such a way that the village afforestation activities were not planned in the villages but the villagers were expected to provide labour and time for them. When it was realized that it was not possible to

Figure 8.2. Specific Interest Space Related to Forestry Activities after BFPP




Source: Vainio-Mattilafor this thesis

rely on volunteers to irrigate the windbreaks and shelterbelts, people from outside the village were employed through the "Food for Work"- programme. As the project started also the enforcement of the conservation policies was tightened. This meant that collection of wood, apart from deadwood, in the riverine zone was forbidden. As deadwood has become scarce, the tenants are increasingly spending their money on purchasing firewood and other fuels. The firewood comes mostly some 40 km north of Bura near Nanighi (Figure 3.2.), also from the riverine forest. It could be said that this is where the firewood shortage of Bura has been partly transferred to.

When BFPP started in Bura in May 1986, their intention was that the central nursery would be strengthened and the village nurseries closed. Both the BFD forester, the researcher in charge of FORP and myself protested strongly against this, and they were allowed to continue. My protest was based on the grounds that although they were not village nurseries in the sense that the villagers would have been running them, a lot of effort had gone into establishing them. They were also established on the basis of Kenyan expertise and technology, and were in this sense sustainable. Also, in my view, they still held the potential to become a focus of participatory village forestry and extension.

An important aspect of Figure 8.2. is that the resource base of BFPP is much larger than that of BFD or tenant households, and that the last two have no control over and only limited access to resources of BFPP. In the following I will discuss how an alternative forestry strategy could have been implemented.

8.2.2. Forestry strategy

I would argue that even if we ignore the other forestry- related needs, growing more trees at the scale intended in Bura is an inadequate response to the growing fuel scarcity in Bura. If the estimated consumption of fuelwood among the tenant families is approximately 1 m3/c/a (Table 7.1.), the total consumption for the tenant families will be 12 600 m3/a, and this is increased to 20 000 m3/a if the satellite population is included. The first phase of the Fuelwood Project catered for planting of 600 ha which would have yielded approximately 10 200 m3 (based on a conservative estimate of 17 m3 as an annual increment) (Johansson et al,1988) at the first harvest in six years' time, had it all been planted. During the first phase only 50 ha were planted which will mean a first yield of 850 m3. Meanwhile, the fuel scarcity will increase.

From a funding point of view, it would seem to make more economic sense to direct investment towards predicting and preventing deterioration rather than reclamation of deforested areas. For example, protecting the riverine forest along Tana River makes sense now, rather than waiting and having to replant it after its destruction. I realize that this is in contradiction to my previous argument where I argued that the conservation of the riverine zone has increased pressure on household resources. It would have been vital to start by increasing the tenants access to alternative sources of fuel, rather than opting for an alternative which will in the long term need to be equally subsidized and yet will weigh heavily on the limited resources of the communities. This is to suggest that energy supply should be based on an integrated approach, integrating for example agricultural production and forestry.

One such alternative source of fuel would have been the agricultural residue of the Scheme. Usually the argument against using agricultural residues for fuel is that this robs the soils of nutrients. In Bura, however, the fields are chemically fertilized, the cotton stalks mostly burned at the end of the season. Maize cobs are too slow to compost for use as fertilizers. The use of such residues as domestic fuel is not new in Kenya. Tenants from the Machakos area claimed that already for two generations pigeon pea stalks and maize cobs had been used instead of firewood.

The expected yield of shelled maize in Bura is 2000 kg/ha. As the shelling percentage is roughly 50%, this means that the expected yield of shelled maize cobs is also 2000 kg/ha. As the tenants plant only one plot (0.625 ha) annually with maize, they could have 1250 kg of maize cobs after the harvest. Based on the experience of those who have already used maize cobs for fuel, 3 kg/day/person seems a good estimate. In a family of seven this would mean that the maize cobs, if fully utilized, could replace firewood for two months a year.

Cotton stalks were also used to supplement the firewood, but to get some idea of the amounts of cotton stalks available I collected ten average sized cotton plants after harvest and measured the weight of the dry main stalks. In average this was 125 grammes. Based on the spacing of 0.4 x 0.9 m of the cotton hills and two plants per hill, there were 68 750 cotton plants in the two plots cultivated by tenants each year (together the plots were 1.25 ha). Based on the experience of cotton stalk users , a family of seven would require 25.2 kg/day. Calculating with the dry weight, the total availability of burnable material per household is 8593.75 kg, or enough for 341

days.

I fully realize that these figures are theoretical in that such harvests are not reached in Bura, and also they are based on small samples of households already using these fuels (11 households for maize, 17 for cotton). In my view though, they do give an indication that there are alternatives even in Bura outside the forestry sector that should have been considered as options for developing the domestic fuel economy.

An alternative approach would be to regard energy as an entry point to priority concerns of the communities, in other words to structure the project on an integrated approach of energy and rural development. A natural focus for a project is the women, of whose time energy related activities, such as cooking and fuel collection, take up a large share. On the other hand, the involvement of the whole community allows for integration of energy issues with a broader spectrum of community issues.

Even the hard-core forestry of species selection has aspects reflected in social responses. There are risks involved both in relying on a previously unknown species and in relying on it to an extent that it eventually becomes the only alternative. For example, in South America and India, some Eucalyptus species has become a focus of heated discussion (Raintree, 1989). Excellent as its burning qualities and building properties are, it depletes soil quality by draining water from it and increasing its acidity. As a result it is boycotted by women, who can not afford to have it growing on the limited land area they have available. A species may be fast-growing and

drought resistant, but also its smokiness, smelliness and thorniness have an effect on its popularity (op cit). BFPP has also been criticized for developing forestry based on monoculture with Prosopis juliflora(BICEDA,1987, pg 8).

Another aspect of fuelwood forestry that needs to be considered from the beginning is the location of the production in relation to where the product is consumed. It is largely the physical distances involved that determine the degree to which participation can be even considered as a possibility (see Figure 4.9. for the location of the forestry block in Bura) by the community. At all times, a realistic view of the community's resources in terms of money, time and labour must be maintained by planners, and this view must be based on a thorough knowledge of the resource base, as well as an understanding of the impact new activities will have on it.

## 8.3. Impact of SERP

It is necessary to examine SERP separately from the BFPP because of the different approaches adopted by these two. It is also important to discuss the impact of SERP because as a participatory research programme we very consciously set out to be a part of the changes taking place in the villages. It was hoped that with SERP, villagers would have an alternative for identifying priorities for development regarding the domestic fuel economy. In this section I will evaluate how far this succeeded.

### 8.3.1. What kind of participation?

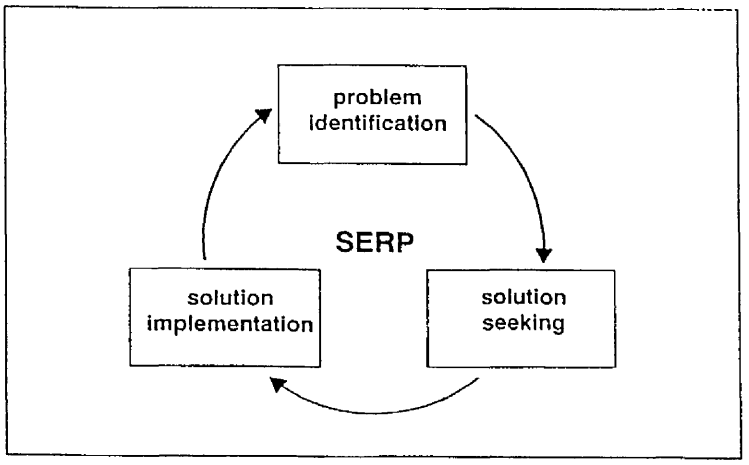
In the field, the research was constantly going through a three stage cycle of problem identification, solution seeking and solution implementation (Figure 8.3.). At any one

time several such processes could be ongoing. Through the networking it was possible for interested villagers to take an active part in this process.(Figure 8.4.)

Because of the nature of PRA, there are continuously situations in which the interest group and the researcher share common experiences, but to what extent is there actual participation in the research? Do we call research participatory if the community in which it takes place can influence the research by suggestion, or is research participatory only when they don the role of a researcher?

In the case of Bura there were at least two occasions, where it could be said that the interest groups were involved in research in a very traditional way.

Figure 8.3. Research cycle




Source: Vainio-Mattilafor this thesis

On one occasion women in Village 1 initiated research of their own. This was the first village we had approached, and so no stoves had been built yet in other villages. It was largely these women who initiated the process of stove building in Bura. The problem was that, although the women felt that the improved stoves would be a very good idea, they also felt that they would need some means of persuading their husbands that the time invested in stove building would be worth it. They suggested that if they could prove that the time and money presently spent on fetching and buying fuelwood was already substantial, this might be enough to convince the men. The research team then prepared exercise books in which twenty women, chosen by the other women, for two months marked, by ticking the appropriate column, the time and money spent in obtaining firewood. The results, which were compiled by the research team, may not be statistically significant to prove anything about fuelwood consumption in general, but they were a clear indication that time and money was spent in substantial quantities. The results were presented on a large poster which was then used by women leaders in meetings with the village committee.

Another activity took place during the identification of materials for the stoves in the vicinity of the village. The villagers would carry out the identification on their own. This required some knowledge of the soils and their durability in a building mass.

On the other hand there were research situations where the technique used could hardly in itself be called participatory, for example, analysis of the soil maps used in Chapter 3.3.1. to identify soil quality on BISS. Even the semi-structured interviews were controlled by me as the researcher, because although the collection of

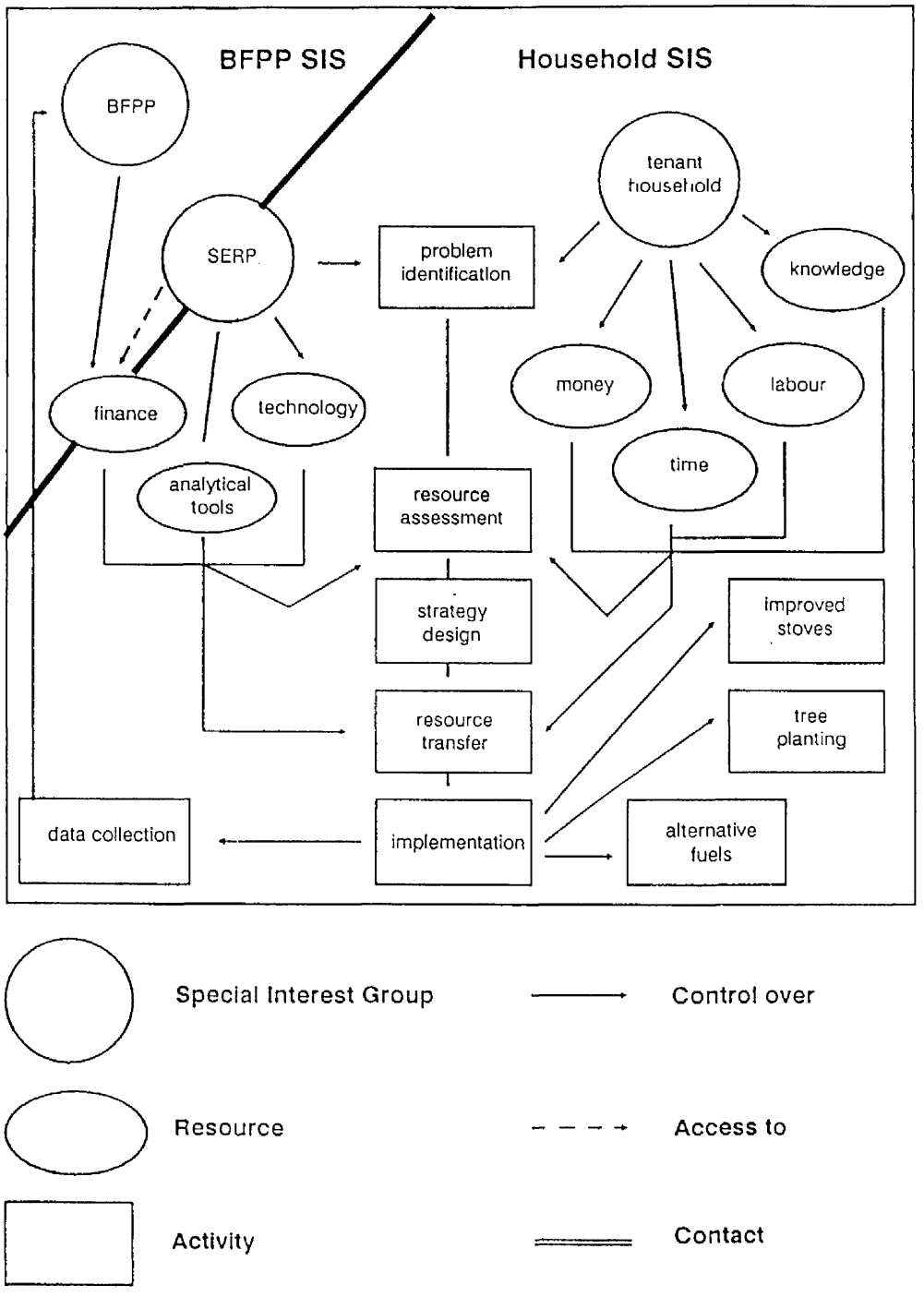
statistically valid data was not their aim, they were introduced to collect information relevant to planning forestry strategies, and to collect information on existent structures and ongoing processes.

The Figure 8.4. is a more detailed schematic description of the relationship between villagers and SERP. What is noteworthy about it is that the whole process takes place in the household SIS, not in BFPP SIS. The SERP SIS would overlap with both of these. The analytical tools that I have marked as a resource for SERP do not refer to a greater ability of analytical thinking, but to a training through which certain research tools have become available. Specifically in Bura it could refer, for example, to initiating the networking process and recording information gained through it, designing the recording system for networking and observation, designing and carrying out interviews, both formal and informal, and access to written resources.

I have purposefully omitted any line linking either SERP to household resources or vice versa. These resources came together in the process for solution identification, but on the conditions of those whose resources they were.

I would argue that in participatory research two kinds of different expertise always exist side by side; one based on knowledge from living in specific circumstances, the other on knowledge that has essentially been taught. This is especially so where research is carried out within a development aid framework, because in that specific context, the participatory research takes on particularly strongly the role of communicator between the community and the project.

Figure 8.4. Participatory Research Approach and Household SIS in Bura




Source: Vainio-Mattilafor this thesis

At the same time I would argue that PRA can be a tool of empowerment within the aid context. In the case of Bura the networking situations were often the only opportunities for tenants to identify problems and solutions together with BFPP/BFD personnel. The research facilitated the process of tenants taking control over those partial solutions to the fuelwood shortage that were possible with the resources they had available to them; stove building, food and fuel preparation techniques, supplementing wood with alternative fuels and so on.

One frustration concerned the follow up of the priority issues identified in the villages (Table 4.1). Because the terms of reference of the research programme were restricted by the interests of the BFPP, it was not always possible to carry out the suggestions made by tenants regarding different situations. We could only go as far as to prompt the relevant authorities. A difficulty for PRA is that development aid is commonly perceived, and thus planned and implemented, in terms of narrow sector expertise. The approach has obvious potential for integrated approach to development.

My experience in Bura was that while problem identification and solution seeking, were participatory, implementation of solutions was possible only if the resources needed were controlled by the villagers, or if the solution was regarded relevant and appropriate by the BFPP. For example, suggestions regarding the use of agricultural waste as a substitute for expensive irrigated fuelwood, were never seriously into consideration.

On the other hand, if a solution was seen to be beneficial and available by some means to which the villagers had access, it was applied. For example, despite it being forbidden, cotton stalks are continuously burned to supplement fuelwood and are also used as fencing in the kitchen garden around the house.

Because of the constant interaction between the research team and the villagers, problems and solutions are identified as a part of the dynamics of the changing living environment. Consequently the research results become active agents of this change, accessible to all those concerned.

Ideally, with PRA it would be possible to influence the development of aid programme all the while it is being implemented. But as these are often implemented according to plans agreed upon by governments even small changes can cause problems. One obstacle is the presentation of "results". Waiting for the final report at the end of the research period restricts the PRA into forms of traditional research, and does away with its potential strength of information that reflects dynamics of ongoing processes in favour of static data.

### 8.3.2. What kind of results?

One of the issues in discussions on development is measurability. The development assistance must somehow be determinable and visible in order to justify a 0.7% contribution of GNP to it. Research usually justifies itself through the medium of reports, the contents of which may or may not be ever consulted or used.

Within participatory research approach one of the aims is to remove as little as possible of information from the research locality. This has been referred to in Chapter 2, but the key thesis is that information and knowledge represent power to control and as research material and results are conventionally produced outside the research locality this constitutes exploitation of the local resource base. In SERP, all records of interviews, meetings, stove programme and diaries were written in two copies, so that one set remained in Bura. These records were also analyzed there as the research was carried out, and very often would serve as a basis for the direction the research took.

If research were carried out purely to ensure participatory development within aid programmes, it would not be necessary to take the information out. It should be possible to carry out research and to implement it within the aid programme so that the feedback would influence the following stages of the research process, and of implementation. This would, however, require the kind of flexibility of the aid programme that does not presently exist. For example, "flexibilityfunds" which could ensure that the initiatives of the community based development strategies could be implemented, even if they are not known at the stage of planning the programme.

SERP is a typical research programme within development aid (although not typical within FINNIDA'said as it was one of the first social science research programmes ever funded within an aid programme) in that it was expected to be carried out before the programme could start. It was seen to contribute mainly towards the planning of the programme and provide baseline data. The reporting was planned

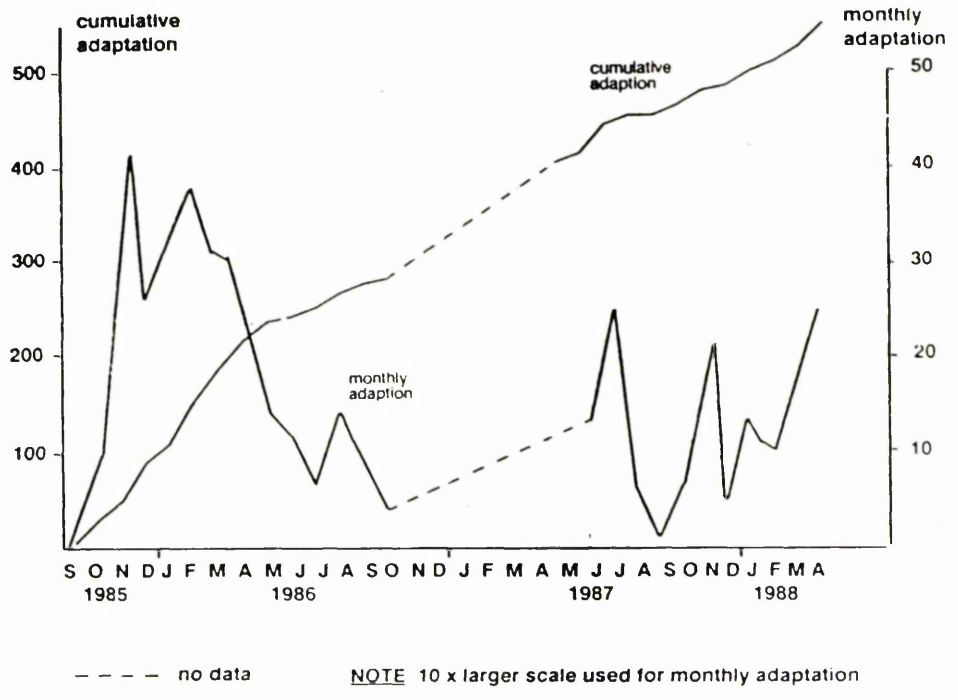
to be carried out in Nairobi (by the Kenyan counterparts) and in Finland. This also happened. In the following section I have tried to analyze the kinds of results that SERP produced and their effect.

Quantitative

At various stages of the research SERP was criticized particularly by the forestry components (research and implementation) for not producing enough precise data. This was partly a wider complaint towards the social sciences in general, partly a specific complaint towards the chosen research approach.

The quantitative information collected through the research process was published by the Institute of Development Studies (Vainio-Mattila,1987). This covered the background to the domestic fuel economy in BISS (physical and social background of the district and BISS; history, aims, administration, agriculture, health and deforestation in BISS), the domestic fuel economy (household economy, consumption of fuelwood, consumption patterns, labour, transportation and distribution, storage) and strategies for reducing woodfuel consumption (forestry, alternative fuels and improved stoves). The kind of data that was presented in the form of tables, some of them used in this thesis, was collected on the basis of the interview strategy and sample described in Appendix 2. The information gained from village, staff and other meetings, discussions with individuals and households, observations and so on is not presented in this form, and is discussed in the following section.

Figure 8.5. Numbers of Improved Mud Stoves built on BISS




Source: fieldwork in Bura

The problem of using this information is illustrated by an example. One of the reasons for describing the agricultural system of the Scheme in detail, including particularly the different phases of work input on the plots (Figure 3.11. of this thesis) was to indicate the times of the agricultural cycle during which tenant participation in extracurricular forestry activities could not realistically be expected. This information, I think, could have been expected to influence, for example, planning of training and extension. Part of the reality is of course that unlike in the project documents, tenants participation in the field has never really been an issue, nor has any extension programme been established.

A recognized contribution of SERP has been the stove programme. The number of stoves has steadily increased and in 1988 the stove programme has been extended to the surrounding nomadic population (Figure 8.5.). It is not recognized by the Project that the stove programme might never have happened had it not been for the research approach adopted which includes the identification of locally implementable strategies in consultation with tenant households, and women in particular.

Qualitative

By qualitative results I do not mean only the kind of data that was difficultto put in tables. Primarily, qualitative results of SERP were, for example, the increased opportunity for villagers to express needs, to explore alternative solutions and to implement these. Secondarily, qualitative results included information gained by SERP to support, or to contradict, some ideas we were formulating.

An important change in quality of life for the villagers resulted from the improved stoves. It has had consequences in various different areas of villagers' lives, for example, a decreased health hazard from smoke and burns, and more money available as amounts of fuel previously burned have lessened. As it is possible to cook two pots at the time, cooking takes less time and as the pots sit half inside the stove, children are not so easily burned by falling cooking vessels. As a result of a letter from SERP to the administration, on the initiative of Village 6 village meeting, on the poor housing, tenants have gained nominal ownership of the houses.

There are also priority problems in the villages (Figure 5.1.) that SERP was not able to affect, such as availability of water for irrigation. Nevertheless, SERP provided the villages with a forum for organizing albeit within a narrow sector, and even these problems were discussed.

I would argue that it was the participatory process initiated by SERP that most effectively functioned as a catalyst for sustainable development. This process expanded the space in which the community could make decisions by establishing a communication between the BFPP and the villages.(Figure 8.4.)

8.4. Impact of aid

To demonstrate the impact of aid on resources in Bura, I would like to use the same profile format as in Chapter 7 for comparison of resources in relation to gender (Table 7.4). Here the comparison will be on the forestry related resources of the household before and after BFPP.(Table 8.2.)

A general comment on Table 8.2. is that in the case of a few resources there is no impact whatsoever. Where there is change, it appears that access is increased, but control decreased. This is because large amounts of resources were imported for the project (see Table 8.1) and thus the resources absolutely increase. The increased access is usually related to opportunities to be employed by BFPP, and in these cases control remains with BFPP. Examples of increased access and decreased control are training, entrepreneurial and employment opportunities. For

Table 8.2. Profile of Impact of BFPP on Household Resources

| | ACCESS | | CONTROL | |
|---|---|---|---|---|
| | M | F | M | F |
| I Resources | | | | |
| Land | ++ → + | -- → -- | -- → -- | -- → -- |
| Money | ++ → ++ | - → - | + → + | - → - |
| Equipment | + → + | - → - | + → - | - → - |
| Labour | + → + | - → - | + → - | - → - |
| Training | - → + | -- → - | -- → -- | -- → -- |
| Entrepreneurial | + → ++ | + → - | + → - | + → - |
| Water | + → + | + → + | - → - | - → - |
| Employment | + → ++ | - → + | - → - | - → - |
| Forest | | | | |
| Firewood | + → - | ++ → + | - → -- | - → -- |
| Charcoal | + → - | - → -- | + → - | - → -- |
| Poles | + → - | - → -- | - → -- | - → -- |
| Income | - → - | - → -- | - → -- | - → -- |
| II Benefits | | | | |
| Outside income | + → ++ | - → - | - → - | - → - |
| Assets ownership | -- → -- | -- → -- | -- → -- | -- → -- |
| Information | + → + | - → + | - → - | - → - |
| Political power | + → + | - → - | - → - | - → - |

++ = good access/decisive control
+ = some access/control

- = little access/control
-- = no access/no control

M = male
F = female

Pre BFPP → Post BFPP

Source: Profileform based on Overholt et al (1985). Content based on interviews and observation in the villages

women the status of entrepreneurial opportunities does not change because most of the opportunities are in the transportation sector.

Why is it that access to forestry resources seems less once BFPP becomes operational? Partially this is due to environmental changes. It is also due to the tightening policies on conservation as described earlier. For women selling headloads of firewood this has been particularly difficult. On the other hand opportunities for outside income, particularly for men, increased as BFPP employed them for thinning and other activities. It should be noted that activities which involved women, such as many nursery operations ("women have such quick fingers"), were operated through the "Food for Work" programme.

The allocation of land for tenant households did not change as a result of BFPP. The reason why I have considered that the household access to land has decreased to some extent is that trees became competitors for the small area around each house on which vegetables were grown. With a water source by the house, this was also the area where the villagers would have some control over the flow of water, although they had no means of storing any. That trees compete with other crops in the household context is not necessarily a negative aspect. Rather it should be seen that such competition exists, and not all households can afford an interest in forestry. On the other hand among those tenants who could have afforded to use more of their resources, such alternatives as establishing small individual woodlots around the house were left largely unexplored.

The BFPP had no significant impact on increasing monetary resources, either. This is because although casual labour, especially men, could find at least seasonal employment with BFPP, opportunities for seasonal employment on the Scheme were already good. The problem, as discussed in Chapter 5, is that during the agricultural peak seasons, which coincide with the busiest forestry season, the poorest households would not be able to afford not to have the whole household present. According to the BFD forester, the majority of the casual labourers were not tenants but from the settled nomadic camps around the Scheme.

The equipment brought from Finland for the forestry activities, was kept under tight control by BFPP. The project involved no provision for more efficient hand tools, for example, to cut wood into small pieces for cooking. On the other hand, in order to "participate" in the thinning of the Prosopis forest, training was required for the use of protective clothing and tools because of the thorns on the trees. Women were largely excluded from this activity.

From the villagers' point of view, BFPP had no impact on the water supply. It was always unreliable. When IDS Nairobi was carrying out their survey, they also brought up the issue of opportunity cost of the land and water, but this was not regarded as a "realistic" question by the BFPP team.

When I selected this particular profile, I expected that it would visually illustrate the impact of the BFPP. However, the "Benefits" section reveals that either the choice of the profile was wrong, or the choice of the project was at fault. The four aspects

mentioned here; outside income, assets ownership, information, and political power, are in my view exactly what an aid programme should aim to increase within the recipient community. Equally, these clearly never were issues for BFPP and it seems inappropriate to evaluate the project on something to which the project planners were oblivious.

The BFPP strategy was based on the establishment of the irrigated fuelwood plantations, as explained earlier. It is unfortunate that the implementation of this strategy was delayed by such factors as shortage of water, as any evaluation of BFPP performance would find it inadequate during Phase I. It could be argued that the difficulties faced by BFPP were largely predictable and should have been taken into account in designing the strategy.

The conclusion I would like to draw on the basis of the above, is that BFPP was able to affect villagers' resources only marginally. There was no intention to increase the villagers own resources to deal with the household shortage. BFPP has been very visible in Bura through the forestry plantation activities, and its impact on BFD has meant complete re-organization of BFD activities. In fact, it would have been more appropriate to identify BFPP as the recipient community of the aid programme.

## 8.5. Conclusion

In this Chapter I have argued that non-participatory and participatory approaches within development aid have different impacts on the resources of the recipient community. I have done this through analyzing the impacts of SERP and BFPP in the

Specific Interest Space of households in Bura. I have argued that participatory research approach can be an appropriate approach within the aid framework in order to establish the communication from the recipient community level upwards.

To prove this argument I have discussed the change that has taken place in both the role of BFD in forestry in Bura and the change that took place in the access to and control over of resources as related to forestry activities. I have shown that the role of BFD in afforestation activities regarding the villages diminished through increased demands on meeting targets in irrigated plantation. Although the overall forestry resources were multiplied through the BFPP, it could be said that these resources were imported to maintain the project, not long term forestry in Bura, and even less to meet domestic fuel shortage.

# 9. CONCLUSION

## 9.1. Introduction

The thesis started with outline of the changes in approach to development aid during the last decade focusing on the World Bank and FINNIDA.Since the early 1980's sustainable development has become a popular concept in "development talk" and I would like to reiterate the definition here. By sustainable development is meant development which meets the current needs of people without endangering the possibility to do so in the future. So what does sustainable development mean in the context of development aid? As I have been undertaking the research for this thesis, as well as observing development aid projects in the Sudan and in southern Africa, I have felt increasing concern that it is the aid that has become sustainable, not the development generated by the projects.

Sustainable development through aid, in my opinion, can only be reached by improving the recipient community's access to and control over resources. In this thesis the recipient community is a rural community, but here in the conclusion I would like to suggest that the term "recipient community" could be applied equally to, for example, a ministry receiving expert assistance, or other organizations such as schools or hospitals. I have argued that the impact of development aid is strongest within the recipient community and therefore it is vital that the process of aid should acknowledge this by starting from existing resources, existing knowledge and needs identified by the recipients. Too often a problem, like the fuelwood shortage in Bura, has been correctly perceived by aid planners as such a need, but the response has

been based on the resources and expertise of the donor country. This reliance on "our" rather than "their" resources is even encouraged. In August 1989 a report was published in Finland by a previous director of FINNIDA(Malinen, 1989), which criticizes the state of development aid policy in Finland and expresses preferable alternatives. He also makes the point that as an expert in forestry, Finland should take an initiativein organizing DACcountries to focus funding in this sector. He argues that "massive" amounts of development aid should be directed towards reforestation in the Third World (op cit, pg 152). Finland may well have expertise in forestry, but the question which has strongly arisen from this case study is how far does it apply outside Finland, where the whole concept of "forest" may have a different physical, social and cultural meaning from that in Finland.

When aid is based on the kind of thinking that all, or even the best, resources needed for development exist here, in the "developed countries", not there in the "undeveloped", surely the central point of sustainability has been missed. Often the reluctance to appreciate existing local resources is unintentional and based on ignorance of the socio-cultural context in which the aid programme is implemented. For example, in March 1989 I was involved in a mission evaluating forestry extension curricula in forestry training colleges in Malawi, Zambia, Botswana and Lesotho. During the six week period it was our repeated experience that illiterate women in villages recognized more local trees, and more uses for these trees, than Edinburgh trained foresters. The same aspect was also brought home to us when a Zambian forester, standing in the middle of a homestead where fruit trees, forest trees and crops grew, was explaining to us how important it would be to educate the Zambians in the

establishment of agroforestry systems. He had been so well trained that he had been blinded to the functioning of existing systems, and he had come to perceive agroforestry in terms of neat rows of crops and trees.

To give this complex relationship between resources, both existing ones and perceived ones, and their users an analytical expression, I have created and developed a new conceptual tool: "Specific Interest Space". In identifying SIS I found Harvey's concept of relational space particularly useful because of the multidimensionality it implies. I feel that this concept could facilitate planning of development aid by conceptualization of different interest groups, their resources and priorities, in relation to the aid programme. In practice this would mean that aid programmes in an area, or within a sector, would start by identifying the various interest groups. The next step would be to identify for each of these groups, or within their SIS, the resources that already exist in the problem area. This would form a basis for continuous monitoring and evaluation of the impact of the aid programme. At its most simple the question could be: does this programme increase the recipients access to and control over the development taking place in their Specific Interest Space?

In addition to resources of the specific community within which the programme is being implemented, often also the institutional framework is ignored. It seems almost a fashion to deride the management capacities of the underdeveloping countries and anyone promoting their use in aid programme management can easily be labelled an idealist. Idealist or not, it is a fundamental feature of sustainable development that it is generated from within systems that already exist in the country. Projects such as

BFPP, where the whole physical and administrative infrastructure of the project is imported from Finland, with littleconsideration for future management or maintenance, will not produce sustainable development. It will leave behind it an empty shell, a space within and beside BFD which will need to be heavily subsidized if present operations are to be maintained. If this subsidy continues to be supplied by Finland, sustainable aid will be the result. On the other hand if the subsidy is supplied by the Government of Kenya, this willcreate increased pressure on her resources and most likely will not be maintained. Subsidy will in any case be necessary because irrigated forestry in Bura will not pay for itself.

In Chapter 3 I summarized the development of the national development policies in Kenya. Whether they have been implemented or not, these policies lay substantial emphasis on development efforts involving rural Kenyans in "nation-building". This kind of policies, such as the District Focus for Rural Development policy, should be taken seriously by donor agencies. The Local/Divisional Development Committees provide a network of people involved in decision making on local development priorities. It is possible to argue that such committees do not represent poor, rural Kenyans who are left outside decision-making structures, and I would agree. It remains, though, that they would provide at least some access to development priorities in the project area, and should be consulted as are representatives of the central administration.

In many ways "perception" has become a crucial concept through this thesis. I have referred to differences in perception of resources and how this affects action, and discussed the differences in perception of what the fuelwood shortage actually means

in Bura. The BFPP strategy has been based on the perception that the fuelwood shortage is a result of shortage of trees, and thus the solution is to make BISS self-sufficient in firewood production. From this perspective the shortage has been caused by excessive use of firewood and so it would also be preferred if the households would consume less firewood. From the firewood users', usually the women's, perspective the fuelwood shortage seems different. First of all it is not their biggest problem, as it is for BFPP. Secondly, it is not so much a shortage of firewood, but a shortage of any fuel to cook on. Thirdly, as long as their means are sufficient only for collection and buying firewood, they have no choice and thus cannot reduce consumption.

These perspectives are in no way exclusive to start off with. Because the shortage of firewood is a felt need in the households, it should be possible to find ways in which the BFPP could use this felt need to open up connections to other priority fields within the household. By finding these connections it would have been able to identify forestry activities which were also related to areas which are felt to be more urgent. The perspectives became exclusive when BFPP strategy was based on resources alien to the villagers, and specifically on resources over which they did not have control.

One of the hypotheses was that Participatory Research Approach could be used to increase the recipients' access to and control over forestry resources and activities within the aid created space . The following is an evaluation of PRA in the context of aid. (See also Appendix 2 for an evaluation of PRA as a field method).

## 9.2. Evaluation of Participatory Research Approach

In Chapter 2 I defined PRA by examining the three central debates within the approach. Firstly, practice vs. theory was discussed. If in some context it is possible to separate theory and praxis, it is not so in development studies. Development itself is an ongoing process whatever the values we attach to it. In the context of development aid the links between theory and practice are emphasized. When the aim is to generate development, it should not be possible to remain ignorant of the socio-cultural context. For research it means that it is difficult to justify research carried out in situations where the resources of the research alone could be used to make substantial changes in the interest of the researched communities. On the other hand these priorities must be defined by the recipient community, and this means that the basis of the research is the praxis of the social reality in the research context. It does not mean that the research should not still aim for excellence in theoretical conceptualization, but it does mean that there must be a wider acceptance for different kinds of knowledge as valid information.

This leads us to the second debate on the production of knowledge. In the development aid context the issue at its most simple is: who knows more about the place than those who have lived there for all their lives? The tenants in Bura had not lived on the Scheme for all their lives, but definitely they had more experience of Bura than any of us carrying out research there. On the other hand, in a participatory process the researcher's knowledge and skills are equally important when they are put in use for common goals. It is important that all participants bring to the process their own experience.

The third debate was on the role of the researcher. In the context of development aid the role of the researcher can be one of an interpreter of different kinds of knowledge. It should also be one of initiating networking and opportunities for those who are receiving assistance to participate in decision making.

In evaluating the shortcomings of the PRA in the context of aid, it is difficult to separate those difficulties that are specific to the context of Bura and BFPP, from those that simply arise from the approach itself. But some of the latter are illustrated by the first.

Firstly, it is not sufficient that one component of a programme is participatory. The use of PRA's potential for communication requires that all aid personnel are familiar with the concepts of networking, participation and research. This was not the case in Bura and the result was that it was never clearly conceptualized what the relationship between BFPP and the villagers was. For example, some discussions should have been held with the village committees on what the mutual expectations were, but this was not done. It is also important that the research is carried out simultaneously with the implementation with constant influence on the activities taking place, and in Bura this was not possible.

Secondly, PRA is never primarily geared at generating data. When the research approach is participatory, data collection should not lead only to analysis but also to action. For example, when the women in Village 1 evaluated their time and money use in relation to firewood procurement, it was enough to know that these amounts were

substantial. The kind of "data" produced by their survey would have no value in a statistical analysis of household economics because the sample was too small and the surveyors were not trained in survey techniques; thus it would be valid to question the reliabilityof their results. The survey was also very narrow covering just two aspects out of a web of complex interlinked aspects that would have constituted a broader view on household economics. However, the women were able to establish that collecting and buying firewood used up household resources to the extent that if less was consumed the impact would be significant. I realize that the expectations directed at a socio-economic component of a project such as BFPP include more conventional "data". I do not want to deny the value of statistics in most fields of research, but in the context of development aid the value of the kind of knowledge assembled through PRA must be of at least equal importance.

It should be acknowledged that PRA can contribute a different understanding, or perspective, to a research agenda. This does not mean to say that only PRA is a valid approach as in some circumstances it could be completely inappropriate. But that in research programmes which ultimately aim to define ways for change, PRA is a tool for involving more perspectives to identify the needs and resources for the change to take place.

The third problem is that while aid is still largely tied to sectoral implementation, in PRA it is not possible to make an a priori decision on the priority issues in the community in which the programme is implemented. This requires the kind of flexibilityin the programme structure that did not exist in Bura, in order to include new activities that

were felt to support the general aims of the project. In Bura this could have meant serious consideration of agricultural residues as fuel, for example.

Even if PRA, especially on the experience of Bura, is far from a problem free tool to be used within development aid, it does have some strengths. The participatory process, is fundamental to sustainable development, and it is better with at least some of it than none at all. PRA can function, through the networking process, as a communicator between various interest groups in the field. In Bura, communication was established with the villagers, but also with extensionists, administration and staff of BISS and BFPP. This meant that preferences could be passed on and people brought together for identification of priorities and solutions.

Secondly, PRA has potential for empowerment of the recipient community. It can function as the channel through which they can gain increased access to resources, and control over their use. This took place in Bura only marginally because only the research component was participatory, and it had no control over the rest of the project. For the realization of the potential for empowerment it is essential that there is a clear conception on the part of the development aid programme of who the intended beneficiaries of the programme are. This was clearly not so in Bura. Not all households need firewood, and those (most of the households) who do need it will not be able to pay the cost of irrigated fuelwood. So who will the project benefit? A participatory approach to the project, not just to the research, could have ensured early identification of alternatives to irrigated firewood just by realizing that it was not a feasible, sustainable solution.

An additional strength of PRA is that the research will constantly adapt to changing situations. The research activity is continuously evaluated by those involved in it and priorities are dealt with preferably in the order of priority. Sometimes this could even serve the purpose of a sectoral project such as BFPP. For example the stoves met first of all the need for a safer kitchen environment for the children, but also reduced firewood consumption.

An important strength of PRA is the opportunity for incorporating local expertise and resources. Through exchange of knowledge it is possible to empower communities to discover solutions for which no new resources are needed. Development aid often involves huge amounts of resources: personnel, finance and technology. That these resources do not always generate development should show to us that there is something fundamentally wrong with the way aid is planned, implemented and monitored. In the final part of the conclusion I will discuss the impact of aid on development.

## 9.3. Conclusion

It is perhaps inevitable that a thesis which is based on a case study of a development aid project must return to the eternal question on what exactly development is. In Chapter 3 I defined development simply as a process which reflects change taking place in space over time. Now I would like to give this definition a more concrete expression by quoting one of the women who had built the Improved Mud Stove and pointing to it said:

"Hiini maendeleo kweli" (This is development, really)

To me this signifies a perception of development where a concrete change has taken place to somehow improve the living conditions. On the other hand, development aid is planned within national, regional and global policy frameworks, and development itself measured in such terms as, for example, the Gross National Product. I would maintain that aid, particularly Finnish aid, is such a small drop in the ocean of money flows in and out of underdeveloping countries that its impact on development remains marginal. On the other hand development aid should be based within the Specific Interest Space of the recipient community, and primarilyaim to increase the recipients' access to and control over resources.

In this thesis I have explored two hypotheses. The first hypothesis was that development aid projects can have an impact (positive or negative) on the resources of the recipients. I used the case study of the Bura Fuelwood Plantation Project and developed the Specific Interest Space as a tool for analyzing this impact. I first analyzed the resources the farmers in Bura had access to prior to the project, and then the changes that resulted from the project. The evidence to support the hypothesis with this analysis I presented in two formats. I discussed the impact both in terms of changes in the accessible resources with the help of gender disaggregated resource profiles. Secondly, I discussed the changes in access to control within the Specific Interest Space.

The second hypothesis was that participatory processes can ensure that the recipients

of aid gain access to and control of resources. The evidence to support this hypothesis was based on socio-economic research carried out using Participatory Research Approach. I discussed the research approach itself and the stove programme which was born out of it.

On the basis of the analysis of the impact of BFPP on the resources of the villagers in BISS, and the evaluation of the role of PRA in the development of the domestic fuel economy in Bura, I retain faith in the possibilities of development aid to cause positive and sustainable change in the living circumstances of those receiving aid, but only when the recipients are active agents of this change.

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# APPENDIX 1 SONGS

The following two songs were both performed by the women of Village 1 when they were hosting a visit from the Village 6 (19.2.1986). The songs are not adequate measures of attitudes as such, but they are indications of the women's awareness regarding tree planting and stove improvement. The songs also express connections made by the women between women's welfare and forestry related activities.

Song 1

1. Karibuni wageni wetu
Karibuni mwakaribishwa

Karibuni hapa, karibuni hapa
Karibuni Village 1

2. Sisi wajengaji majiko
Twakaribishwa wageni wetu

3. Tunafuata mwito wa Arja
Kujenga jiko, kupanda miti

Song 1: Translation

1. Welcome our guests
You are welcome

Welcome here, welcome here
Welcome to Village 1

2. We are builders of stoves
We welcome our guests

3. We respond to Arja's call
To build a stove, to plant trees

Song 2

1. Sisi ni village one
Watu wa majiko
Tunafanya Harambee
Jiunge na sisi

Kweli sisi
Tumejiunga na kujenga
Majiko

2. Ukijiunga na sisi
Utapata raha
Afya ya watoto
Pamoja na mama

3. Usipojenga Lorena[1]
Shida ya nyumbani
Maisha mbaya mbaya
Utapata wewe

4. Tuokoeni migongo
Kichwa na mapesa
Tujenge taifa
Tulee watoto

5. Tupandani miti sana
Tujenge majiko
Tunifadi mizitu
Ni uchumi wa Kenya

6. Tulipojenga Lorena
Afya tulipata
Hagara hakuna
Tunana raha sana

7. Umomonyoko wa undongo
Ni mbaya sana
Humalisha ardhi
Hatutaki sisi

Song 2: Translation

1. We are village one
People with stoves
We work "Harambee"
Come and join us

We are really joined
togetherand we are
building stove

2. If you join us
You'll live well
And be healthy
Children and mothers

3. If you don't build Lorena[1]
Your life will be bad
And in your home
You'll have trouble

4. Let's save our backs
Our head and our money
Let us build the nation
And nurture the children

5. Let's plant many trees
Let's build many stoves
Let's preserve the forests
And economy of Kenya

6. By building Lorena
We have built our health
We have lost nothing
We are fine

7. Erosion of the soil
Is very, very bad
It wears out the earth
It is not for us.

[1] Lorena refers to the Improved Mud Stove (see Appendix 4)

## APPENDIX 2 INTERVIEWS

### Fields of interest for the Interview

1. date, house number, village
2. name of respondent, gender, age, relationship to tenant, education
3. if the respondent was not the tenant; tenants gender, age, education
4. nationality, place of origin, date of arrival in Bura, other relatives living in Bura
5. household size; numbers of women and men over 16 years, numbers of girls and boys under 16 years, each persons relationship to the tenant
6. income; monthly from the board, last harvest of cotton (kg), income from maize/vegetables/off-farm
7. expenses; labour/food/fuel/schools/clothes/agricultural inputs
8. fire; uses, function of smoke inside the house, accidents with fire in the house or village, which fuels, which stoves, reasons for using/not using Three Stone Stove
9. fuelwood; source, means of getting it, costs, amount used, storage, who collects/buys, which money is used for paying firewood
10. trees; which trees are used for fuel/building/ medicinal purposes, planting of trees around the house (which trees, why, numbers, protection, whose responsibility, water source), species not burned inside the house and why not
11. food; which foods are cooked and how often (daily, weekly, monthly) what is cheap/expensive, differences in food in Bura and "home", what food is not good for you, when did you last celebrate and what did you cook then
12. division of labour; what is women's/men's/children's work in the house/on the farm, what are they not allowed to do
13. leisure; what social groups do the members of the household belong to
14. community; any need for changes, what is the main problem today in the village

**Habari-themes**

1. Home
2. Children
3. Health
4. Fields (cotton/maize/vegetables)
5. Trees
6. Fuel

**The sample sizes and structures in each village**

| VILLAGE | | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|
| SAMPLE SIZE | | 33 | 41 | 30 | 27 | 30 |
| % OF VILLAGE POPULATION | | 20.6% | 19.5% | 17.4% | 17.4% | 15.0% |
| % OF INTERVIEWED WOMEN | | 72.7% | 63.4% | 53.3% | 55.6% | 63.3% |
| % OF INTERVIEWED TENANTS | | 42.4% | 39.0% | 56.7% | 63.0% | 50.0% |
| NUMBER OF TENANTS | | | | | | |
| | VC * : | 160 | 210 | 172 | 155 | 199 |
| | SO ** : | 184 | 247 | 191 | 203 | 210 |
| AVERAGE HOUSEHOLD SIZE, | SERP***: | 7.2 | 7.4 | 6.3 | 5.7 | 5.8 |
| | SO : | 7.3 | 7.0 | 6.8 | 6.9 | 5.7 |
| VILLAGE POPULATION | | | | | | |
| | VC : | 1152 | 1554 | 1084 | 884 | 1154 |
| | SO : | 1337 | 1736 | 1299 | 1397 | 1191 |
| % OF TENANTS WOMEN | | | | | | |
| | SERP : | 21.2% | 7.3% | 16.7% | 22.2% | 20.0% |
| | SO : | 13.6% | 5.7% | 20.3% | 14.0% | 28.6% |
| % OF TENANTS FROM TANA RIVER | | | | | | |
| | SERP : | 33.3% | 68.3% | 33.3% | 29.6% | 20.0% |
| | SO : | 36.4% | 61.5% | 37.7% | 36.5% | 9.0% |

* Village Chairman
** Scheme Settlement Office records, 1986
*** Social and Economic Research Interviews, 1985/1986

| VILLAGE | | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|
| SAMPLE SIZE | | 31 | 27 | 28 | 28 | 29 |
| % OF VILLAGE POPULATION | | 22.1% | 16.8% | 15.6% | 13.5% | 20.0% |
| % OF INTERVIEWED WOMEN | | 67.7% | 63.0% | 57.1% | 57.1% | 86.2% |
| % OF INTERVIEWED TENANTS | | 48.4% | 44.4% | 50.0% | 21.4% | 44.8% |
| NUMBER OF TENANTS | | | | | | |
| | VC * : | 140 | 161 | 180 | 208 | 145 |
| | SO ** : | 143 | 179 | 192 | 208 | 190 |
| AVERAGE HOUSEHOLD SIZE, | SERP ***: | 7.4 | 5.8 | 7.4 | 7.1 | 5.7 |
| | SO : | 5.8 | 6.6 | 5.9 | 7.7 | 5.9 |
| VILLAGE POPULATION | | | | | | |
| | VC : | 1036 | 934 | 1332 | 1477 | 827 |
| | SO : | 827 | 1175 | 1139 | 1611 | 1127 |
| % OF TENANTS WOMEN | | | | | | |
| | SERP : | 16.1% | 14.8% | 21.4% | 14.3% | 34.5% |
| | SO : | 18.2% | 20.1% | 13.5% | 10.1% | 38.4% |
| % OF TENANTS FROM TANA RIVER | | | | | | |
| | SERP : | 16.1% | 11.1% | 14.3% | 42.9% | 17.2% |
| | SO : | 19.6% | 14.55 | 7.8% | 54.3% | 29.7% |

* Village Chairman
** Scheme Settlement Office records, 1986
*** Social and Economic Research interviews, 1985/86

## APPENDIX 3 ETHNIC COMPOSITION OF BISS

In Appendix 3 the ethnic composition of BISS is illustrated. The numbers of households in each village are obtained from ledgers kept by the village chairmen. In my experiemnce these were on the whole more reliable than statistics kept by the Settlement Office. I have also indicated the number of interviews carried out as well as the ethnic composition of the interview sample for each village.

VILLAGE 1

| | NUMBER ACCORDING TO CHAIRMAN | % OF VILLAGE POPULATION | NUMBER OF INTER-VIEWS | % OF THOSE INTERVIEWED |
|---|---|---|---|---|
| KIKUYU | 34 | 21.4% | 8 | 24.2% |
| MALAKOTE | 29 | 18.1% | 4 | 12.1% |
| POKOMO | 24 | 15.0% | 4 | 12.1% |
| LUHYA | 22 | 13.8% | 3 | 9.1% |
| KISII | 13 | 8.1% | 3 | 9.1% |
| LUO | 9 | 5.6% | 5 | 15.2% |
| ORMA | 9 | 5.6% | 2 | 6.2% |
| KAMBA | 9 | 5.6% | 1 | 3.0% |
| KOROKORO | 4 | 2.5% | 1 | 3.0% |
| SOMALI | 4 | 2.5% | 1 | 3.0% |
| MERU | 1 | 0.6% | - | --- |
| KALENJIN | 1 | 0.6% | - | --- |
| TESO | 1 | 0.6% | - | --- |
| MARAGORI | - | --- | 1 | 3.0% |
| TOTAL | 160 | 100.0% | 33 | 100.0% |

VILLAGE 2

| | NUMBER ACCORDING TO CHAIRMAN | % OF VILLAGE POPULATION | NUMBER OF INTER-VIEWS | % OF THOSE INTERVIEWED |
|---|---|---|---|---|
| MALAKOTE | 72 | 34.3% | 14 | 34.1% |
| POKOMO | 54 | 25.7% | 10 | 24.4% |
| KAMBA | 22 | 10.5% | 6 | 14.6% |
| ORMA | 22 | 10.5% | 3 | 7.3% |
| TAITA | 12 | 5.7% | 2 | 5.0% |
| EMBU | 8 | 3.8% | 2 | 5.0% |
| KIKUYU | 7 | 3.3% | 1 | 2.4% |
| GIRIYAMA | 7 | 3.3% | 1 | 2.4% |
| SANYE | 4 | 1.9% | 1 | 2.4% |
| LUO | 1 | 0.5% | 1 | 2.4% |
| BORANA | 1 | 0.5% | - | --- |
| TOTAL | 210 | 100.0% | 41 | 100.0% |

VILLAGE 3

| | NUMBER ACCORDING TO CHAIRMAN | % OF VILLAGE POPULATION | NUMBER OF INTER-VIEWS | % OF THOSE INTERVIEWED |
|---|---|---|---|---|
| KIKUYU | 62 | 36.0% | 10 | 33.3% |
| ORMA | 30 | 17.4% | 5 | 16.7% |
| LUHYA | 28 | 16.3% | 3 | 10.0% |
| MALAKOTE | 17 | 9.9% | 3 | 10.0% |
| KISII | 10 | 5.8% | 4 | 13.3% |
| POKOMO | 10 | 5.8% | 2 | 6.8% |
| KAMBA | 6 | 3.4% | 1 | 3.3% |
| SOMALI | 2 | 1.2% | - | --- |
| TURKANA | 2 | 1.2% | 1 | 3.3% |
| WATA | 2 | 1.2% | - | --- |
| MUNYOYAYA | 1 | 0.6% | - | --- |
| TESO | 1 | 0.6% | - | --- |
| TAITA | 1 | 0.6% | 1 | 3.3% |
| TOTAL | 172 | 100.0% | 29 | 100.0% |

VILLAGE 4

| | NUMBER ACCORDING TO CHAIRMAN | % OF VILLAGE POPULATION | NUMBER OF INTER-VIEWS | % OF THOSE INTERVIEWED |
|---|---|---|---|---|
| ORMA | 26 | 16.8% | 3 | 11.1% |
| MALAKOTE | 25 | 16.1% | 5 | 18.5% |
| SOMALI | 23 | 14.8% | 3 | 11.1% |
| LUO | 23 | 14.8% | 5 | 18.5% |
| KIKUYU | 18 | 11.6% | - | --- |
| LUHYA | 15 | 9.7% | 7 | 25.9% |
| KAMBA | 8 | 5.5% | 3 | 11.1% |
| BORANA | 7 | 4.5% | - | --- |
| POKOMO | 5 | 3.1% | - | --- |
| TAITA | 5 | 3.1% | 1 | 3.8% |
| TOTAL | 155 | 100.0% | 27 | 100.0% |

VILLAGE 5

| | NUMBER ACCORDING TO CHAIRMAN | % OF VILLAGE POPULATION | NUMBER OF INTER-VIEWS | % OF THOSE INTERVIEWED |
|---|---|---|---|---|
| KIKUYU | 103 | 51.8% | 11 | 36.7% |
| KAMBA | 50 | 25.1 | 8 | 26.7% |
| POKOMO | 9 | 4.5% | 4 | 13.3% |
| LUHYA | 9 | 4.5% | 2 | 6.7% |
| LUO | 6 | 3.0% | - | --- |
| KISII | 6 | 3.0% | - | --- |
| MERU | 6 | 3.0% | 1 | 3.3% |
| MALAKOTE | 4 | 2.0% | - | --- |
| BORANA | 3 | 1.5% | 1 | 3.3% |
| NUBIAN | 2 | 1.0% | 1 | 3.3% |
| ORMA | 1 | 0.5% | 2 | 6.7% |
| TOTAL | 199 | 100.0% | 30 | 100.0% |

VILLAGE 6

| | NUMBER ACCORDING TO CHAIRMAN | % OF VILLAGE POPULATION | NUMBER OF INTER-VIEWS | % OF THOSE INTERVIEWED |
|---|---|---|---|---|
| KIKUYU | 91 | 65.0% | 18 | 58.1% |
| POKOMO | 19 | 13.6% | 4 | 12.9% |
| LUHYA | 18 | 12.9% | 4 | 12.9% |
| LUO | 5 | 3.6% | 2 | 6.5% |
| ORMA | 2 | 1.4% | 1 | 3.2% |
| KISII | 2 | 1.4% | 1 | 3.2% |
| SOMALI | 1 | 0.7% | - | --- |
| BORANA | 1 | 0.7% | - | --- |
| KOROKORO | 1 | 0.7% | - | --- |
| MALAKOTE | - | --- | 1 | 3.2% |
| TOTAL | 140 | 100.0% | 31 | 100.0% |

VILLAGE 7

| | NUMBER ACCORDING TO CHAIRMAN | % OF VILLAGE POPULATION | NUMBER OF INTER-VIEWS | % OF THOSE INTERVIEWED |
|---|---|---|---|---|
| KIKUYU | 83 | 51.6% | 14 | 51.9% |
| KAMBA | 27 | 16.8% | 4 | 14.8% |
| MALAKOTE | 11 | 6.8% | 2 | 7.4% |
| EMBU | 9 | 5.5% | 1 | 3.7% |
| MERU | 6 | 3.7% | 1 | 3.7% |
| ORMA | 5 | 3.0% | 1 | 3.7% |
| TAITA | 5 | 3.0% | 1 | 3.7% |
| LUHYA | 4 | 2.5% | - | --- |
| GIRIAMA | 3 | 1.8% | 1 | 3.7% |
| POKOMO | 3 | 1.8% | 1 | 3.7% |
| SOMALI | 1 | 0.7% | - | --- |
| LUO | 1 | 0.7% | - | --- |
| TURKANA | 1 | 0.7% | - | --- |
| BAJUNI | 1 | 0.7% | - | --- |
| BORANA | 1 | 0.7% | - | --- |
| DURUMA | - | --- | 1 | 3.7% |
| TOTAL | 161 | 100.0% | 27 | 100.0% |

VILLAGE 8

| | NUMBER ACCORDING TO CHAIRMAN | % OF VILLAGE POPULATION | NUMBER OF INTER-VIEWS | % OF THOSE INTERVIEWED |
|---|---|---|---|---|
| SOMALI | 78 | 43.3% | 9 | 32.1% |
| LUHYA | 26 | 14.4% | 5 | 17.9% |
| KIKUYU | 15 | 8.3% | 2 | 7.1% |
| LUO | 15 | 8.3% | 2 | 7.1% |
| KISII | 14 | 7.8% | 3 | 10.7% |
| KAMBA | 10 | 5.6% | 2 | 7.1% |
| ORMA | 8 | 4.4% | 1 | 3.6% |
| MALAKOTE | 6 | 3.3% | 1 | 3.6% |
| NANDI | 5 | 2.8% | 1 | 3.6% |
| MERU | 3 | 1.7% | 1 | 3.6% |
| BAJUNI | - | --- | 1 | 3.6% |
| TOTAL | 180 | 100.0% | 28 | 100.0% |

VILLAGE 9

| | NUMBER ACCORDING TO CHAIRMAN | % OF VILLAGE POPULATION | NUMBER OF INTER-VIEWS | % OF THOSE INTERVIEWED |
|---|---|---|---|---|
| SOMALI | 115 | 55.3% | 10 | 35.7% |
| MALAKOTE | 36 | 17.3% | 6 | 21.4% |
| POKOMO | 36 | 17.3% | 4 | 14.3% |
| KOROKORO | 8 | 3.8% | 2 | 7.1% |
| LUO | 6 | 2.9% | - | --- |
| LUHYA | 3 | 1.4% | - | --- |
| KAMBA | 2 | 1.0% | 1 | 3.6% |
| SANYE | 1 | 0.5% | 1 | 3.6% |
| KIKUYU | 1 | 0.5% | - | --- |
| ARAB | - | --- | 1 | 3.6% |
| TESO | - | --- | 1 | 3.6% |
| BUKUSU | - | --- | 1 | 3.6% |
| TURKANA | - | --- | 1 | 3.6% |
| TOTAL | 208 | 100.0% | 28 | 100.0% |

VILLAGE 10

| | NUMBER ACCORDING TO CHAIRMAN | % OF VILLAGE POPULATION | NUMBER OF INTER-VIEWS | % OF THOSE INTERVIEWED |
|---|---|---|---|---|
| KAMBA | 44 | 30.3% | 7 | 24.1% |
| KIKUYU | 16 | 11.0% | 4 | 13.8% |
| LUO | 14 | 9.7% | 4 | 13.8% |
| MERU | 12 | 8.3% | - | --- |
| LUHYA | 11 | 7.6% | 5 | 17.2% |
| ORMA | 10 | 6.9% | 1 | 3.4% |
| EMBU | 8 | 5.5% | - | --- |
| SOMALI | 6 | 4.1% | 1 | 3.4% |
| POKOMO | 5 | 3.4% | - | --- |
| MALAKOTE | 4 | 2.7% | 3 | 10.3% |
| KISII | 3 | 2.1% | 1 | 3.4% |
| KOROKORO | 3 | 2.1% | - | --- |
| NANDI | 3 | 2.1% | - | --- |
| TAITA | 2 | 1.4% | - | --- |
| GIRIAMA | 2 | 1.4% | - | --- |
| MASAI | 1 | 0.7% | - | --- |
| KURIA | 1 | 0.7% | - | --- |
| MUNYOYAYA | - | --- | 1 | 3.4% |
| BORANA | - | --- | 1 | 3.4% |
| DURUMA | - | --- | 1 | 3.4% |
| TOTAL | 145 | 100.0% | 29 | 100.0% |

# APPENDIX 4 THE IMPROVED MUD STOVE

## A. Materials

The basic materials for the Improved Mud Stove were clay, sand, water and either cow dung or ash. Cow dung and ash functioned as binders due to their high fibre content. To test the suitability of the mixture for building, we used the so called "snowball test". This involves making fist sized tight ball of the mixture and dropping it from waist height. If the it contained too much water, the ball would lose its shape. On the other hand if the amount of clay was inadequate, the ball would crack. This test was useful because, as the villages were at varying distances from the river the silt content in the soil also varied, we needed to have some way of judging the right mixture. On the other hand this method did not involve any measuring equipment, and was accessible to all involved in stove building.

All the above materials were available throughout the year in, or near, the villages. In the building process described below I refer to a frame. In order to make the building of many similar stoves easier, we made some effort to standardize the size of the stoves by using a wooden frame. These frames were prepared by the BISS carpenter. With funding from SERP five frames were built for each village, and they were used over and over again. The maintenance of these frames was also taken care of by SERP.

During the early stages of the stove development, we were still looking for alternative ways of improving the stove. On the suggestion of a German stove expert we then tried a mixture of vermiculite and cement on the floor of the stove. The purpose of this was to insulate the floor so that no heat would escape down. There is no doubt that this improved the quality of the stove, but both of these had to be transported from Nairobi and were not locally available. After

having brought in one sack of each, I did not bring any more as there was at the time no way of organizing a reliable supply to Bura. Also the cost was prohibitive for most of the villagers.

After I left Bura, the stoves were further improved by developing chimneys of concrete and metal pipes. The materials for these are provided for by BFPP and installed by the socio-economic research assistants with the help of the villagers.

## B. Building procedure

Prior to the first building day, the tenant and her/his household would have been responsible for obtaining the materials. Usually a source(s) of clay and sand was identified in the village by a team of villagers and then utilized by all. Water and ash/cow dung was usually available on a household basis.

1. Day (usually involving a group of neighbours and friends)

- the stove site was identified so that wind would not blow directly at the stove from either the door or through the chimney hole in the wall
- the frame was placed firmly against the corner of the site, usually with the help of stones or sticks
- sand and clay would be mixed first, and then the water was added. Finally ash/cow dung was added (Plate 18)
- the mixture would be packed tightly inside the frame and the top levelled.

2. Day

- the stove dries and nothing is done to it

3. Day (involved a research assistant and the household)

- the frame is removed (Plate 19)

4. Day

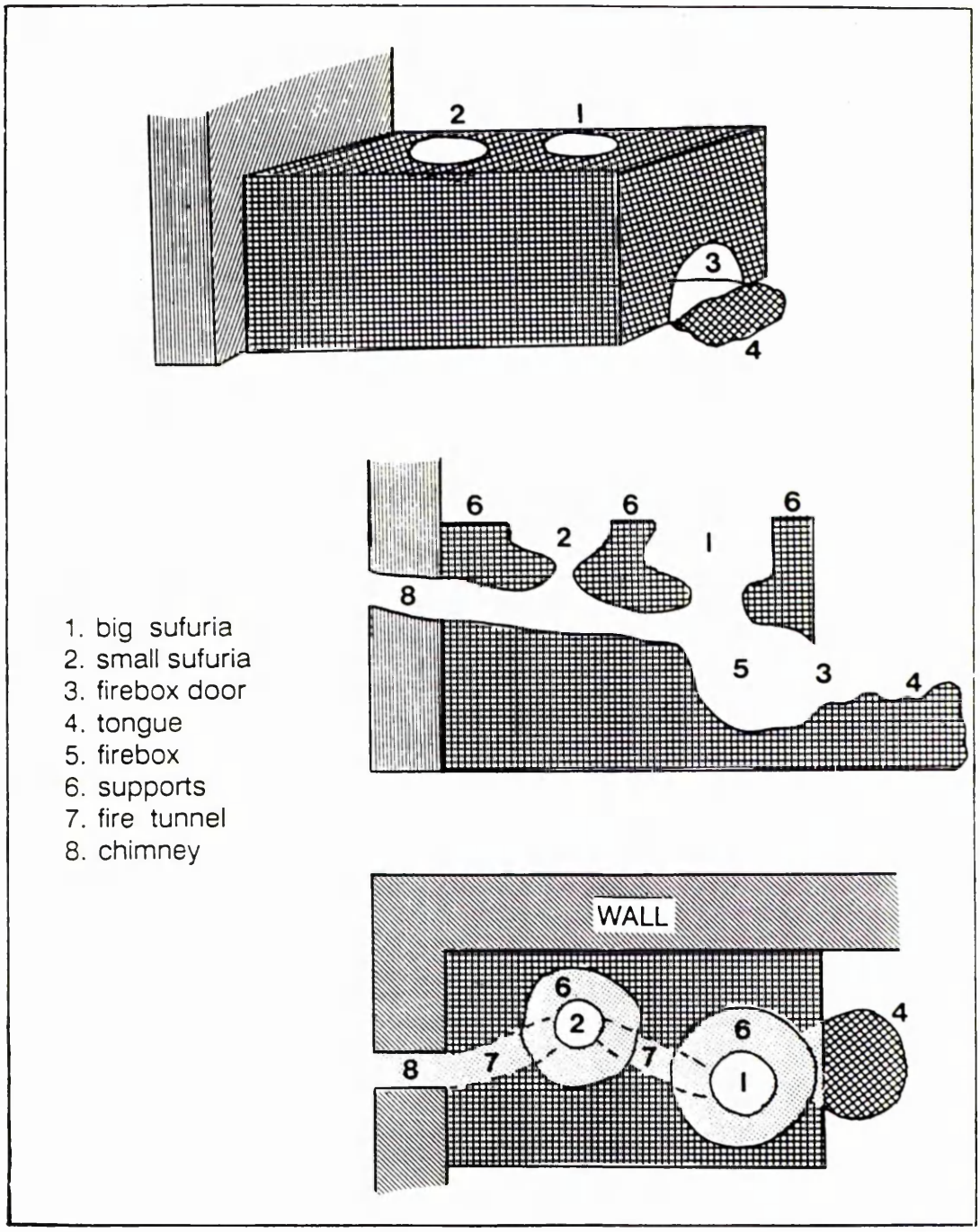
- the stove continues drying and nothing is done to it

5. Day (involved the household)

- two potholes are measured according to the size of most often used cooking vessels of the household (Plate 20)
- with the help of spoons and knives the inside of the stove is carved (Figure A4.1)
- when the carving is completed the pots are fitted for size (Plate 21)

After the fifth day the stove was in principle for ready for use (Plate 22). We advised the users to start slowly in case the drying was not complete. The research assistant responsible for the village would return later to advice on the maintenance of the stove.

Figure A4.1. The Improved Mud Stove




1. big sufuria
2. small sufuria
3. firebox door
4. tongue
5. firebox
6. supports
7. fire tunnel
8. chimney